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Department of Defense Fiscal Year (FY) 2019 Budget Estimates

February 2018



Navy

Justification Book Volume 2 of 5

Research, Development, Test & Evaluation, Navy
Budget Activity 4

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The estimated cost for this report for the Department of the Navy (DON) is \$94,790.

The estimated total cost for supporting the DON budget justification material is approximately \$1,643,653 for the 2018 fiscal year. This includes \$79,753 in supplies and \$1,563,900 in labor.

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Navy • Budget Estimates FY 2019 • RDT&E Program

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Department of Defense Appropriations Act, 2019

Research, Development, Test and Evaluation, Navy

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, \$18,649,478,000 to remain available for obligation until September 30, 2020.

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Department of Defense
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

Appropriation	FY 2017 (Base + OCO)	FY 2018	FY 2018	FY 2018	FY 2018
		PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests+ with CR Adj OCO
<hr/>					
Research, Development, Test & Eval, Navy	17,851,955	17,116,976	17,091,976	326,537	326,537
Total Research, Development, Test & Evaluation	17,851,955	17,116,976	17,091,976	326,537	326,537
<hr/>					
Other RDT&E Budget Activities Not Included in the Research, Development, Test and Evaluation Title					
<hr/>					
National Defense Sealift Fund	7,237	18,622	18,622		
Total Not in Research, Development, Test & Evaluation	7,237	18,622	18,622		

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Department of Defense
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

Appropriation	FY 2018			FY 2018			FY 2018		
	FY 2018	Less Enacted		Total	Less Enacted		FY 2018		
	Emergency Requests**	P.L.115-96***	FY 2018 MDDE + Ship Remaining Req Emergency Repairs	PB Requests* with CR Adj	P.L.115-96***	with CR Adj	Base + OCO + MDDE + Ship Emergency**	Base + OCO + Repairs	Remaining Req Emergency
Research, Development, Test & Eval, Navy	60,000	-60,000		17,478,513	-60,000		17,418,513		
Total Research, Development, Test & Evaluation	60,000	-60,000		17,478,513	-60,000		17,418,513		
Other RDT&E Budget Activities Not Included in the Research, Development, Test and Evaluation Title									
National Defense Sealift Fund				18,622			18,622		
Total Not in Research, Development, Test & Evaluation				18,622			18,622		

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Research, Development, Test & Eval, Navy	18,451,066	198,412	18,649,478
Total Research, Development, Test & Evaluation	18,451,066	198,412	18,649,478

Other RDT&E Budget Activities Not Included in the Research, Development, Test and Evaluation Title

National Defense Sealift Fund

Total Not in Research, Development, Test & Evaluation

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Department of Defense
 FY 2019 President's Budget
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 Total Obligational Authority
 (Dollars in Thousands)

	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Summary Recap of Budget Activities					
Basic Research	549,384	595,901	595,901		
Applied Research	954,884	886,079	886,079		
Advanced Technology Development	811,211	686,342	686,342		
Advanced Component Development & Prototypes	4,510,800	4,218,714	4,193,714	27,710	59,510
System Development & Demonstration	5,928,185	6,362,102	6,362,102		5,400
Management Support	1,279,290	945,757	945,757		
Operational Systems Development	3,818,201	3,980,140	3,980,140	102,655	102,655
Undistributed		-558,059	-558,059	196,172	158,972
Total Research, Development, Test & Evaluation	17,851,955	17,116,976	17,091,976	326,537	326,537
Summary Recap of FYDP Programs					
Strategic Forces	187,327	201,735	201,735		
General Purpose Forces	1,407,847	1,675,797	1,675,797	12,800	12,800
Intelligence and Communications	927,792	751,779	751,779		
Research and Development	13,686,598	13,589,349	13,564,349	27,710	64,910
Central Supply and Maintenance	40,169	43,035	43,035		
Administration and Associated Activities	136	-556,310	-556,310	196,172	158,972
Space		47,244	47,244		
Classified Programs	1,602,086	1,364,347	1,364,347	89,855	89,855
Total Research, Development, Test & Evaluation	17,851,955	17,116,976	17,091,976	326,537	326,537

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Department of Defense
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

	FY 2018			FY 2018		
	FY 2018	Less Enacted		PB Requests*	FY 2018	
		Div B	P.L.115-96***		Total	Less Enacted
Summary Recap of Budget Activities	Emergency Requests**	MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	Base + OCO + Emergency**	P.L.115-96***	FY 2018 Remaining Req
Basic Research					595,901	595,901
Applied Research					886,079	886,079
Advanced Technology Development					686,342	686,342
Advanced Component Development & Prototypes					4,253,224	4,253,224
System Development & Demonstration					6,367,502	6,367,502
Management Support					945,757	945,757
Operational Systems Development	60,000	-60,000			4,142,795	-60,000
Undistributed					-399,087	-399,087
Total Research, Development, Test & Evaluation	60,000	-60,000			17,478,513	-60,000
Summary Recap of FYDP Programs					17,418,513	
Strategic Forces					201,735	201,735
General Purpose Forces					1,688,597	1,688,597
Intelligence and Communications					751,779	751,779
Research and Development					13,629,259	13,629,259
Central Supply and Maintenance					43,035	43,035
Administration and Associated Activities					-397,338	-397,338
Space					47,244	47,244
Classified Programs	60,000	-60,000			1,514,202	-60,000
Total Research, Development, Test & Evaluation	60,000	-60,000			17,478,513	-60,000
					17,418,513	

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Department of Defense
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Basic Research	597,378		597,378
Applied Research	891,471		891,471
Advanced Technology Development	750,995		750,995
Advanced Component Development & Prototypes	4,293,713	33,300	4,327,013
System Development & Demonstration	6,042,480	1,100	6,043,580
Management Support	1,020,569		1,020,569
Operational Systems Development	4,854,460	164,012	5,018,472
Undistributed			
Total Research, Development, Test & Evaluation	18,451,066	198,412	18,649,478
Summary Recap of FYDP Programs			
Strategic Forces	251,501		251,501
General Purpose Forces	1,982,258	16,130	1,998,388
Intelligence and Communications	626,028		626,028
Research and Development	13,979,095	34,400	14,013,495
Central Supply and Maintenance	43,844		43,844
Administration and Associated Activities	1,579		1,579
Space	47,858		47,858
Classified Programs	1,518,903	147,882	1,666,785
Total Research, Development, Test & Evaluation	18,451,066	198,412	18,649,478

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Department of Defense
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
<hr/>					
Summary Recap of Non-RDT&E Title FYDP Programs					
Mobility Forces	7,237	18,622	18,622		
Total Research, Development, Test & Evaluation	7,237	18,622	18,622		

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Department of Defense
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

	FY 2018	Less Enacted	FY 2018	Total	Less Enacted	FY 2018
FY 2018	Div B	PB Requests*	PB Requests* with CR Adj	P.L.115-96***	DIV B	Remaining Req with CR Adj
Emergency Requests**	P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	Base + OCO + Emergency**	MDDE + Ship Repairs	Base + OCO + Emergency	Base + OCO + Emergency
-----	-----	-----	-----	-----	-----	-----

Summary Recap of Non-RDT&E Title FYDP Programs

Mobility Forces	18,622	18,622
Total Research, Development, Test & Evaluation	18,622	18,622

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

FY 2019 Base	FY 2019 OCO	FY 2019 Total
-----	-----	-----

Summary Recap of Non-RDT&E Title FYDP Programs

Mobility Forces

Total Research, Development, Test & Evaluation

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Department of the Navy
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

Summary Recap of Budget Activities	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Basic Research	549,384	595,901	595,901		
Applied Research	954,884	886,079	886,079		
Advanced Technology Development	811,211	686,342	686,342		
Advanced Component Development & Prototypes	4,510,800	4,218,714	4,193,714	27,710	59,510
System Development & Demonstration	5,928,185	6,362,102	6,362,102		5,400
Management Support	1,279,290	945,757	945,757		
Operational Systems Development	3,818,201	3,980,140	3,980,140	102,655	102,655
Undistributed		-558,059	-558,059	196,172	158,972
Total Research, Development, Test & Evaluation	17,851,955	17,116,976	17,091,976	326,537	326,537
Summary Recap of FYDP Programs					
Strategic Forces	187,327	201,735	201,735		
General Purpose Forces	1,407,847	1,675,797	1,675,797	12,800	12,800
Intelligence and Communications	927,792	751,779	751,779		
Research and Development	13,686,598	13,589,349	13,564,349	27,710	64,910
Central Supply and Maintenance	40,169	43,035	43,035		
Administration and Associated Activities	136	-556,310	-556,310	196,172	158,972
Space		47,244	47,244		
Classified Programs	1,602,086	1,364,347	1,364,347	89,855	89,855
Total Research, Development, Test & Evaluation	17,851,955	17,116,976	17,091,976	326,537	326,537

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Department of the Navy
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

	FY 2018			FY 2018		
	FY 2018	Less Enacted		PB Requests*	FY 2018	
		Div B	P.L.115-96***		Total	Less Enacted
Summary Recap of Budget Activities	Emergency Requests**	MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	Base + OCO + Emergency**	P.L.115-96***	FY 2018 Remaining Req
Basic Research					595,901	595,901
Applied Research					886,079	886,079
Advanced Technology Development					686,342	686,342
Advanced Component Development & Prototypes					4,253,224	4,253,224
System Development & Demonstration					6,367,502	6,367,502
Management Support					945,757	945,757
Operational Systems Development	60,000	-60,000			4,142,795	-60,000
Undistributed					-399,087	-399,087
Total Research, Development, Test & Evaluation	60,000	-60,000			17,478,513	-60,000
Summary Recap of FYDP Programs					17,418,513	
Strategic Forces					201,735	201,735
General Purpose Forces					1,688,597	1,688,597
Intelligence and Communications					751,779	751,779
Research and Development					13,629,259	13,629,259
Central Supply and Maintenance					43,035	43,035
Administration and Associated Activities					-397,338	-397,338
Space					47,244	47,244
Classified Programs	60,000	-60,000			1,514,202	-60,000
Total Research, Development, Test & Evaluation	60,000	-60,000			17,478,513	-60,000
					17,418,513	

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Department of the Navy
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Basic Research	597,378		597,378
Applied Research	891,471		891,471
Advanced Technology Development	750,995		750,995
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Management Support	1,020,569		1,020,569
Operational Systems Development	4,854,460	164,012	5,018,472
Undistributed			
Total Research, Development, Test & Evaluation	18,451,066	198,412	18,649,478
Summary Recap of FYDP Programs			
Strategic Forces	251,501		251,501
General Purpose Forces	1,982,258	16,130	1,998,388
Intelligence and Communications	626,028		626,028
Research and Development	13,979,095	34,400	14,013,495
Central Supply and Maintenance	43,844		43,844
Administration and Associated Activities	1,579		1,579
Space	47,858		47,858
Classified Programs	1,518,903	147,882	1,666,785
Total Research, Development, Test & Evaluation	18,451,066	198,412	18,649,478

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Department of the Navy
 FY 2019 President's Budget
 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
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1 0601103N	University Research Initiatives	01	117,320	118,130	118,130		U
2 0601152N	In-House Laboratory Independent Research	01	18,238	19,438	19,438		U
3 0601153N	Defense Research Sciences	01	413,826	458,333	458,333		U
	Basic Research		-----	549,384	595,901	595,901	-----
4 0602114N	Power Projection Applied Research	02	69,950	13,553	13,553		U
5 0602123N	Force Protection Applied Research	02	192,579	125,557	125,557		U
6 0602131M	Marine Corps Landing Force Technology	02	67,874	53,936	53,936		U
7 0602235N	Common Picture Applied Research	02	40,649	36,450	36,450		U
8 0602236N	Warfighter Sustainment Applied Research	02	50,465	48,649	48,649		U
9 0602271N	Electromagnetic Systems Applied Research	02	114,613	79,598	79,598		U
10 0602435N	Ocean Warfighting Environment Applied Research	02	79,941	42,411	42,411		U
11 0602651M	Joint Non-Lethal Weapons Applied Research	02	6,146	6,425	6,425		U
12 0602747N	Undersea Warfare Applied Research	02	120,537	56,094	56,094		U
13 0602750N	Future Naval Capabilities Applied Research	02	152,427	156,805	156,805		U
14 0602782N	Mine and Expeditionary Warfare Applied Research	02	31,256	32,733	32,733		U

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Department of the Navy
 FY 2019 President's Budget
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 Total Obligational Authority
 (Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B P.L.115-96*** Base + OCO + MDDE + Ship Repairs	Base + OCO + Emergency		
			Emergency	-----	-----		-----	-----		
1 0601103N	University Research Initiatives	01					118,130		118,130	U
2 0601152N	In-House Laboratory Independent Research	01					19,438		19,438	U
3 0601153N	Defense Research Sciences	01					458,333		458,333	U
Basic Research							595,901		595,901	
4 0602114N	Power Projection Applied Research	02					13,553		13,553	U
5 0602123N	Force Protection Applied Research	02					125,557		125,557	U
6 0602131M	Marine Corps Landing Force Technology	02					53,936		53,936	U
7 0602235N	Common Picture Applied Research	02					36,450		36,450	U
8 0602236N	Warfighter Sustainment Applied Research	02					48,649		48,649	U
9 0602271N	Electromagnetic Systems Applied Research	02					79,598		79,598	U
10 0602435N	Ocean Warfighting Environment Applied Research	02					42,411		42,411	U
11 0602651M	Joint Non-Lethal Weapons Applied Research	02					6,425		6,425	U
12 0602747N	Undersea Warfare Applied Research	02					56,094		56,094	U
13 0602750N	Future Naval Capabilities Applied Research	02					156,805		156,805	U
14 0602782N	Mine and Expeditionary Warfare Applied Research	02					32,733		32,733	U

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Department of the Navy
 FY 2019 President's Budget
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 Total Obligational Authority
 (Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c
-- -----	----	---	-----	-----	-----	-
1 0601103N	University Research Initiatives	01	119,433		119,433	U
2 0601152N	In-House Laboratory Independent Research	01	19,237		19,237	U
3 0601153N	Defense Research Sciences	01	458,708		458,708	U
	Basic Research		-----	-----	-----	
			597,378		597,378	
4 0602114N	Power Projection Applied Research	02	14,643		14,643	U
5 0602123N	Force Protection Applied Research	02	124,049		124,049	U
6 0602131M	Marine Corps Landing Force Technology	02	59,607		59,607	U
7 0602235N	Common Picture Applied Research	02	36,348		36,348	U
8 0602236N	Warfighter Sustainment Applied Research	02	56,197		56,197	U
9 0602271N	Electromagnetic Systems Applied Research	02	83,800		83,800	U
10 0602435N	Ocean Warfighting Environment Applied Research	02	42,998		42,998	U
11 0602651M	Joint Non-Lethal Weapons Applied Research	02	6,349		6,349	U
12 0602747N	Undersea Warfare Applied Research	02	58,049		58,049	U
13 0602750N	Future Naval Capabilities Applied Research	02	147,771		147,771	U
14 0602782N	Mine and Expeditionary Warfare Applied Research	02	37,545		37,545	U

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Department of the Navy
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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base
15 0602792N	Innovative Naval Prototypes (INP) Applied Research	02		171,146	171,146	
16 0602861N	Science and Technology Management - ONR Field Activities	02		62,722	62,722	
17 0602898N	Science and Technology Management - ONR Headquarters	02	28,447			
	Applied Research		-----	-----	-----	-----
			954,884	886,079	886,079	
18 0603114N	Power Projection Advanced Technology	03	97,122			
19 0603123N	Force Protection Advanced Technology	03	83,146	26,342	26,342	
20 0603271N	Electromagnetic Systems Advanced Technology	03	25,726	9,360	9,360	
21 0603640M	USMC Advanced Technology Demonstration (ATD)	03	137,190	154,407	154,407	
22 0603651M	Joint Non-Lethal Weapons Technology Development	03	12,790	13,448	13,448	
23 0603671N	Navy Advanced Technology Development (ATD)	03				
24 0603673N	Future Naval Capabilities Advanced Technology Development	03	254,203	231,772	231,772	
25 0603680N	Manufacturing Technology Program	03	55,555	57,797	57,797	
26 0603729N	Warfighter Protection Advanced Technology	03	39,486	4,878	4,878	
27 0603747N	Undersea Warfare Advanced Technology	03	25,352			
28 0603758N	Navy Warfighting Experiments and Demonstrations	03	67,965	64,889	64,889	

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Department of the Navy
 FY 2019 President's Budget
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 Total Obligational Authority
 (Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B Base + OCO + MDDE + Ship Repairs	FY 2018 Base + OCO + Emergency		
			Emergency	-----	-----		-----	-----		
15 0602792N	Innovative Naval Prototypes (INP) Applied Research	02					171,146		171,146	U
16 0602861N	Science and Technology Management - ONR Field Activities	02					62,722		62,722	U
17 0602898N	Science and Technology Management - ONR Headquarters	02								U
	Applied Research						886,079		886,079	
18 0603114N	Power Projection Advanced Technology	03								U
19 0603123N	Force Protection Advanced Technology	03					26,342		26,342	U
20 0603271N	Electromagnetic Systems Advanced Technology	03					9,360		9,360	U
21 0603640M	USMC Advanced Technology Demonstration (ATD)	03					154,407		154,407	U
22 0603651M	Joint Non-Lethal Weapons Technology Development	03					13,448		13,448	U
23 0603671N	Navy Advanced Technology Development (ATD)	03								U
24 0603673N	Future Naval Capabilities Advanced Technology Development	03					231,772		231,772	U
25 0603680N	Manufacturing Technology Program	03					57,797		57,797	U
26 0603729N	Warfighter Protection Advanced Technology	03					4,878		4,878	U
27 0603747N	Undersea Warfare Advanced Technology	03								U
28 0603758N	Navy Warfighting Experiments and Demonstrations	03					64,889		64,889	U

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Department of the Navy
 FY 2019 President's Budget
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 Total Obligational Authority
 (Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c
--	----	---	-----	-----	-----	-
15 0602792N	Innovative Naval Prototypes (INP) Applied Research	02	159,697		159,697	U
16 0602861N	Science and Technology Management - ONR Field Activities	02	64,418		64,418	U
17 0602898N	Science and Technology Management - ONR Headquarters	02				U
	Applied Research		891,471		891,471	
18 0603114N	Power Projection Advanced Technology	03				U
19 0603123N	Force Protection Advanced Technology	03	2,423		2,423	U
20 0603271N	Electromagnetic Systems Advanced Technology	03				U
21 0603640M	USMC Advanced Technology Demonstration (ATD)	03	150,245		150,245	U
22 0603651M	Joint Non-Lethal Weapons Technology Development	03	13,313		13,313	U
23 0603671N	Navy Advanced Technology Development (ATD)	03	131,502		131,502	U
24 0603673N	Future Naval Capabilities Advanced Technology Development	03	232,996		232,996	U
25 0603680N	Manufacturing Technology Program	03	58,657		58,657	U
26 0603729N	Warfighter Protection Advanced Technology	03				U
27 0603747N	Undersea Warfare Advanced Technology	03				U
28 0603758N	Navy Warfighting Experiments and Demonstrations	03				U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
29 0603782N	Mine and Expeditionary Warfare Advanced Technology	03	12,676	15,164	15,164		U
30 0603801N	Innovative Naval Prototypes (INP) Advanced Technology Development	03		108,285	108,285		U
	Advanced Technology Development		-----	-----	-----	-----	-----
			811,211	686,342	686,342		
31 0603207N	Air/Ocean Tactical Applications	04	44,175	48,365	48,365		U
32 0603216N	Aviation Survivability	04	14,811	5,566	5,566		U
33 0603251N	Aircraft Systems	04	1,519	695	695		U
34 0603254N	ASW Systems Development	04	6,877	7,661	7,661		U
35 0603261N	Tactical Airborne Reconnaissance	04	3,265	3,707	3,707		U
36 0603382N	Advanced Combat Systems Technology	04	3,583	61,381	61,381		U
37 0603502N	Surface and Shallow Water Mine Countermeasures	04	126,761	154,117	154,117		U
38 0603506N	Surface Ship Torpedo Defense	04	69,872	14,974	14,974		U
39 0603512N	Carrier Systems Development	04	7,516	9,296	9,296		U
40 0603525N	PILOT FISH	04	137,435	132,083	132,083		U
41 0603527N	RETRACT LARCH	04	48,583	15,407	15,407	22,000	22,000 U
42 0603536N	RETRACT JUNIPER	04	107,871	122,413	122,413		U
43 0603542N	Radiological Control	04	677	745	745		U
44 0603553N	Surface ASW	04	1,039	1,136	1,136		U
45 0603561N	Advanced Submarine System Development	04	120,289	100,955	100,955		U

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Program Line Element No Number	Item	Act	FY 2018	Less Enacted	FY 2018	Total	FY 2018	Less Enacted	FY 2018	Remaining Req
			FY 2018	Div B	P.B Requests*	P.B Requests*	DIV B	with CR Adj	with CR Adj	S
			Emergency Requests**	P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req	Base + OCO + Emergency**	MDDE + Ship Repairs	Base + OCO + Emergency**	Base + OCO + Emergency**	e
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29 0603782N	Mine and Expeditionary Warfare Advanced Technology	03				15,164			15,164	U
30 0603801N	Innovative Naval Prototypes (INP) Advanced Technology Development	03				108,285			108,285	U
	Advanced Technology Development			-----	-----	-----	-----	686,342	-----	686,342
31 0603207N	Air/Ocean Tactical Applications	04				48,365			48,365	U
32 0603216N	Aviation Survivability	04				5,566			5,566	U
33 0603251N	Aircraft Systems	04				695			695	U
34 0603254N	ASW Systems Development	04				7,661			7,661	U
35 0603261N	Tactical Airborne Reconnaissance	04				3,707			3,707	U
36 0603382N	Advanced Combat Systems Technology	04				61,381			61,381	U
37 0603502N	Surface and Shallow Water Mine Countermeasures	04				154,117			154,117	U
38 0603506N	Surface Ship Torpedo Defense	04				14,974			14,974	U
39 0603512N	Carrier Systems Development	04				9,296			9,296	U
40 0603525N	PILOT FISH	04				132,083			132,083	U
41 0603527N	RETRACT LARCH	04				37,407			37,407	U
42 0603536N	RETRACT JUNIPER	04				122,413			122,413	U
43 0603542N	Radiological Control	04				745			745	U
44 0603553N	Surface ASW	04				1,136			1,136	U
45 0603561N	Advanced Submarine System Development	04				100,955			100,955	U

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29 0603782N	Mine and Expeditionary Warfare Advanced Technology	03				U
30 0603801N	Innovative Naval Prototypes (INP) Advanced Technology Development	03	161,859		161,859	U
	Advanced Technology Development		750,995		750,995	
31 0603207N	Air/Ocean Tactical Applications	04	29,747		29,747	U
32 0603216N	Aviation Survivability	04	7,050		7,050	U
33 0603251N	Aircraft Systems	04	793		793	U
34 0603254N	ASW Systems Development	04	7,058		7,058	U
35 0603261N	Tactical Airborne Reconnaissance	04	3,540		3,540	U
36 0603382N	Advanced Combat Systems Technology	04	59,741		59,741	U
37 0603502N	Surface and Shallow Water Mine Countermeasures	04	62,727		62,727	U
38 0603506N	Surface Ship Torpedo Defense	04	8,570		8,570	U
39 0603512N	Carrier Systems Development	04	5,440		5,440	U
40 0603525N	PILOT FISH	04	162,222		162,222	U
41 0603527N	RETRACT LARCH	04	11,745	18,000	29,745	U
42 0603536N	RETRACT JUNIPER	04	114,265		114,265	U
43 0603542N	Radiological Control	04	740		740	U
44 0603553N	Surface ASW	04	1,122		1,122	U
45 0603561N	Advanced Submarine System Development	04	109,086		109,086	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO
46 0603562N	Submarine Tactical Warfare Systems	04	8,603	13,834	13,834	U
47 0603563N	Ship Concept Advanced Design	04	14,359	36,891	36,891	U
48 0603564N	Ship Preliminary Design & Feasibility Studies	04	13,451	12,012	12,012	U
49 0603570N	Advanced Nuclear Power Systems	04	453,313	329,500	329,500	U
50 0603573N	Advanced Surface Machinery Systems	04	30,255	29,953	29,953	U
51 0603576N	CHALK EAGLE	04	353,146	191,610	191,610	U
52 0603581N	Littoral Combat Ship (LCS)	04	50,806	40,991	40,991	U
53 0603582N	Combat System Integration	04	23,839	24,674	24,674	U
54 0603595N	Ohio Replacement	04	681,164	776,158	776,158	U
55 0603596N	LCS Mission Modules	04	153,595	116,871	116,871	U
56 0603597N	Automated Test and Analysis	04	14,507	8,052	8,052	U
57 0603599N	Frigate Development	04	83,080	143,450	143,450	U
58 0603609N	Conventional Munitions	04	8,342	8,909	8,909	U
59 0603611M	Marine Corps Assault Vehicles	04	131,381			U
60 0603635M	Marine Corps Ground Combat/Support System	04	1,043	1,428	1,428	U
61 0603654N	Joint Service Explosive Ordnance Development	04	48,686	53,367	53,367	29,700 U
62 0603713N	Ocean Engineering Technology Development	04	4,639	8,212	8,212	U
63 0603721N	Environmental Protection	04	19,117	20,214	20,214	U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	Base + OCO + e Emergency	Base + OCO + e Emergency	
			Emergency	-----	-----		-----	-----	-----	
46 0603562N	Submarine Tactical Warfare Systems	04				13,834			13,834	U
47 0603563N	Ship Concept Advanced Design	04				36,891			36,891	U
48 0603564N	Ship Preliminary Design & Feasibility Studies	04				12,012			12,012	U
49 0603570N	Advanced Nuclear Power Systems	04				329,500			329,500	U
50 0603573N	Advanced Surface Machinery Systems	04				29,953			29,953	U
51 0603576N	CHALK EAGLE	04				191,610			191,610	U
52 0603581N	Littoral Combat Ship (LCS)	04				40,991			40,991	U
53 0603582N	Combat System Integration	04				24,674			24,674	U
54 0603595N	Ohio Replacement	04				776,158			776,158	U
55 0603596N	LCS Mission Modules	04				116,871			116,871	U
56 0603597N	Automated Test and Analysis	04				8,052			8,052	U
57 0603599N	Frigate Development	04				143,450			143,450	U
58 0603609N	Conventional Munitions	04				8,909			8,909	U
59 0603611M	Marine Corps Assault Vehicles	04								U
60 0603635M	Marine Corps Ground Combat/Support System	04				1,428			1,428	U
61 0603654N	Joint Service Explosive Ordnance Development	04				83,067			83,067	U
62 0603713N	Ocean Engineering Technology Development	04				8,212			8,212	U
63 0603721N	Environmental Protection	04				20,214			20,214	U

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46 0603562N	Submarine Tactical Warfare Systems	04	9,374		9,374	U
47 0603563N	Ship Concept Advanced Design	04	89,419		89,419	U
48 0603564N	Ship Preliminary Design & Feasibility Studies	04	13,348		13,348	U
49 0603570N	Advanced Nuclear Power Systems	04	256,137		256,137	U
50 0603573N	Advanced Surface Machinery Systems	04	22,109		22,109	U
51 0603576N	CHALK EAGLE	04	29,744		29,744	U
52 0603581N	Littoral Combat Ship (LCS)	04	27,997		27,997	U
53 0603582N	Combat System Integration	04	16,351		16,351	U
54 0603595N	Ohio Replacement	04	514,846		514,846	U
55 0603596N	LCS Mission Modules	04	103,633		103,633	U
56 0603597N	Automated Test and Analysis	04	7,931		7,931	U
57 0603599N	Frigate Development	04	134,772		134,772	U
58 0603609N	Conventional Munitions	04	9,307		9,307	U
59 0603611M	Marine Corps Assault Vehicles	04				U
60 0603635M	Marine Corps Ground Combat/Support System	04	1,828		1,828	U
61 0603654N	Joint Service Explosive Ordnance Development	04	43,148	13,900	57,048	U
62 0603713N	Ocean Engineering Technology Development	04	5,915		5,915	U
63 0603721N	Environmental Protection	04	19,811		19,811	U

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			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO
64 0603724N	Navy Energy Program	04	69,500	50,623	25,623	U
65 0603725N	Facilities Improvement	04	4,213	2,837	2,837	U
66 0603734N	CHALK CORAL	04	225,665	245,143	245,143	U
67 0603739N	Navy Logistic Productivity	04	2,973	2,995	2,995	U
68 0603746N	RETRACT MAPLE	04	301,871	306,101	306,101	U
69 0603748N	LINK PLUMERIA	04	259,756	253,675	253,675	U
70 0603751N	RETRACT ELM	04	51,720	55,691	55,691	U
71 0603764N	LINK EVERGREEN	04	46,282	48,982	48,982	U
72 0603787N	Special Processes	04	13,088			U
73 0603790N	NATO Research and Development	04	8,567	9,099	9,099	U
74 0603795N	Land Attack Technology	04	17,260	33,568	33,568	2,100 U
75 0603851M	Joint Non-Lethal Weapons Testing	04	26,760	29,873	29,873	U
76 0603860N	Joint Precision Approach and Landing Systems - Dem/Val	04	102,195	106,391	106,391	U
77 0603925N	Directed Energy and Electric Weapon Systems	04	34,039	107,310	107,310	U
78 0604014N	F/A -18 Infrared Search and Track (IRST)	04				U
79 0604027N	Digital Warfare Office	04				U
80 0604028N	Small and Medium Unmanned Undersea Vehicles	04				U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018		
			FY 2018 Emergency	Less Enacted Div B P.L.115-96***	FY 2018 MDDE + Ship Remaining Req		DIV B P.L.115-96***	Base + OCO + MDDE + Ship	Remaining Req Base + OCO + e			
			Requests** Emergency	Repairs	Emergency		Emergency** Repairs	Emergency	Emergency			
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64 0603724N	Navy Energy Program	04					25,623			25,623		U
65 0603725N	Facilities Improvement	04					2,837			2,837		U
66 0603734N	CHALK CORAL	04					245,143			245,143		U
67 0603739N	Navy Logistic Productivity	04					2,995			2,995		U
68 0603746N	RETRACT MAPLE	04					306,101			306,101		U
69 0603748N	LINK PLUMERIA	04					253,675			253,675		U
70 0603751N	RETRACT ELM	04					55,691			55,691		U
71 0603764N	LINK EVERGREEN	04					48,982			48,982		U
72 0603787N	Special Processes	04										U
73 0603790N	NATO Research and Development	04					9,099			9,099		U
74 0603795N	Land Attack Technology	04					35,668			35,668		U
75 0603851M	Joint Non-Lethal Weapons Testing	04					29,873			29,873		U
76 0603860N	Joint Precision Approach and Landing Systems - Dem/Val	04					106,391			106,391		U
77 0603925N	Directed Energy and Electric Weapon Systems	04					107,310			107,310		U
78 0604014N	F/A -18 Infrared Search and Track (IRST)	04										U
79 0604027N	Digital Warfare Office	04										U
80 0604028N	Small and Medium Unmanned Undersea Vehicles	04										U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
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64 0603724N	Navy Energy Program	04	25,656		25,656	U
65 0603725N	Facilities Improvement	04	5,301		5,301	U
66 0603734N	CHALK CORAL	04	267,985		267,985	U
67 0603739N	Navy Logistic Productivity	04	4,059		4,059	U
68 0603746N	RETRACT MAPLE	04	377,878		377,878	U
69 0603748N	LINK PLUMERIA	04	381,770		381,770	U
70 0603751N	RETRACT ELM	04	60,535		60,535	U
71 0603764N	LINK EVERGREEN	04				U
72 0603787N	Special Processes	04				U
73 0603790N	NATO Research and Development	04	9,652		9,652	U
74 0603795N	Land Attack Technology	04	15,529	1,400	16,929	U
75 0603851M	Joint Non-Lethal Weapons Testing	04	27,581		27,581	U
76 0603860N	Joint Precision Approach and Landing Systems - Dem/Val	04	101,566		101,566	U
77 0603925N	Directed Energy and Electric Weapon Systems	04	223,344		223,344	U
78 0604014N	F/A -18 Infrared Search and Track (IRST)	04	108,700		108,700	U
79 0604027N	Digital Warfare Office	04	26,691		26,691	U
80 0604028N	Small and Medium Unmanned Undersea Vehicles	04	16,717		16,717	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
81 0604029N	Unmanned Undersea Vehicle Core Technologies	04					U
82 0604030N	Rapid Prototyping, Experimentation and Demonstration.	04					U
83 0604031N	Large Unmanned Undersea Vehicles	04					U
84 0604112N	Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80)	04	69,185	83,935	83,935		U
85 0604122N	Remote Minehunting System (RMS)	04	2,926				U
86 0604126N	Littoral Airborne MCM	04					U
87 0604127N	Surface Mine Countermeasures	04					U
88 0604272N	Tactical Air Directional Infrared Countermeasures (TADIRCM)	04	59,753	46,844	46,844	5,710	5,710 U
89 0604286M	Marine Corps Additive Manufacturing Technology Development	04		6,200	6,200		U
90 0604289M	Next Generation Logistics	04					U
91 0604292N	MH-XX	04	1,618				U
92 0604320M	Rapid Technology Capability Prototype	04		7,055	7,055		U
93 0604454N	LX (R)	04	24,730	9,578	9,578		U
94 0604536N	Advanced Undersea Prototyping	04	57,363	66,543	66,543		U
95 0604659N	Precision Strike Weapons Development Program	04	4,874	31,315	31,315		U
96 0604707N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	04	20,104	42,851	42,851		U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B Base + OCO + MDDE + Ship Emergency**	FY 2018 Base + OCO + Emergency		
			Emergency	Repairs	Emergency		Repairs	Emergency		
--	----	---	-----	-----	-----	-----	-----	-----	-----	-
81 0604029N	Unmanned Undersea Vehicle Core Technologies	04								U
82 0604030N	Rapid Prototyping, Experimentation and Demonstration.	04								U
83 0604031N	Large Unmanned Undersea Vehicles	04								U
84 0604112N	Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80)	04				83,935			83,935	U
85 0604122N	Remote Minehunting System (RMS)	04								U
86 0604126N	Littoral Airborne MCM	04								U
87 0604127N	Surface Mine Countermeasures	04								U
88 0604272N	Tactical Air Directional Infrared Countermeasures (TADIRCM)	04				52,554			52,554	U
89 0604286M	Marine Corps Additive Manufacturing Technology Development	04				6,200			6,200	U
90 0604289M	Next Generation Logistics	04								U
91 0604292N	MH-XX	04								U
92 0604320M	Rapid Technology Capability Prototype	04				7,055			7,055	U
93 0604454N	LX (R)	04				9,578			9,578	U
94 0604536N	Advanced Undersea Prototyping	04				66,543			66,543	U
95 0604659N	Precision Strike Weapons Development Program	04				31,315			31,315	U
96 0604707N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	04				42,851			42,851	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
---	----	---	-----	-----	-----	-
81 0604029N	Unmanned Undersea Vehicle Core Technologies	04	30,187		30,187	U
82 0604030N	Rapid Prototyping, Experimentation and Demonstration.	04	48,796		48,796	U
83 0604031N	Large Unmanned Undersea Vehicles	04	92,613		92,613	U
84 0604112N	Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80)	04	58,121		58,121	U
85 0604122N	Remote Minehunting System (RMS)	04				U
86 0604126N	Littoral Airborne MCM	04	17,622		17,622	U
87 0604127N	Surface Mine Countermeasures	04	18,154		18,154	U
88 0604272N	Tactical Air Directional Infrared Countermeasures (TADIRCM)	04	47,278		47,278	U
89 0604286M	Marine Corps Additive Manufacturing Technology Development	04				U
90 0604289M	Next Generation Logistics	04	11,081		11,081	U
91 0604292N	MH-XX	04				U
92 0604320M	Rapid Technology Capability Prototype	04	7,107		7,107	U
93 0604454N	LX (R)	04	5,549		5,549	U
94 0604536N	Advanced Undersea Prototyping	04	87,669		87,669	U
95 0604659N	Precision Strike Weapons Development Program	04	132,818		132,818	U
96 0604707N	Space and Electronic Warfare (SEW) Architecture/Engineering Support	04	7,230		7,230	U

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 Total Obligational Authority
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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
97 0604786N	Offensive Anti-Surface Warfare Weapon Development	04	301,554	160,694	160,694		U
98 0605812M	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	04	7,658				U
99 0303354N	ASW Systems Development - MIP	04	9,110	8,278	8,278		U
100 0304240M	Advanced Tactical Unmanned Aircraft System	04		7,979	7,979		U
101 0304240N	Advanced Tactical Unmanned Aircraft System	04					U
102 0304270N	Electronic Warfare Development - MIP	04	437	527	527		U
	Advanced Component Development & Prototypes		4,510,800	4,218,714	4,193,714	27,710	59,510
103 0603208N	Training System Aircraft	05	17,490	16,945	16,945		U
104 0604212N	Other Helo Development	05	5,889	26,786	26,786		U
105 0604214M	AV-8B Aircraft - Eng Dev	05					U
106 0604214N	AV-8B Aircraft - Eng Dev	05	32,179	48,780	48,780		U
107 0604215N	Standards Development	05	1,300	2,722	2,722		U
108 0604216N	Multi-Mission Helicopter Upgrade Development	05	5,189	5,371	5,371		U
109 0604218N	Air/Ocean Equipment Engineering	05	3,747	782	782		U
110 0604221N	P-3 Modernization Program	05	1,864	1,361	1,361		U
111 0604230N	Warfare Support System	05	11,404	14,167	14,167	5,400	U
112 0604231N	Tactical Command System	05	36,190	55,695	55,695		U

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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	Base + OCO + e	-----	
			Emergency	-----	-----		-----	-----	-----	
97 0604786N	Offensive Anti-Surface Warfare Weapon Development	04					160,694			160,694 U
98 0605812M	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	04								U
99 0303354N	ASW Systems Development - MIP	04					8,278			8,278 U
100 0304240M	Advanced Tactical Unmanned Aircraft System	04					7,979			7,979 U
101 0304240N	Advanced Tactical Unmanned Aircraft System	04								U
102 0304270N	Electronic Warfare Development - MIP	04	-----	-----	-----		527			527 U
	Advanced Component Development & Prototypes		-----	-----	-----		4,253,224			4,253,224
103 0603208N	Training System Aircraft	05					16,945			16,945 U
104 0604212N	Other Helo Development	05					26,786			26,786 U
105 0604214M	AV-8B Aircraft - Eng Dev	05								U
106 0604214N	AV-8B Aircraft - Eng Dev	05					48,780			48,780 U
107 0604215N	Standards Development	05					2,722			2,722 U
108 0604216N	Multi-Mission Helicopter Upgrade Development	05					5,371			5,371 U
109 0604218N	Air/Ocean Equipment Engineering	05					782			782 U
110 0604221N	P-3 Modernization Program	05					1,361			1,361 U
111 0604230N	Warfare Support System	05					19,567			19,567 U
112 0604231N	Tactical Command System	05					55,695			55,695 U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
---	----	---	-----	-----	-----	-
97 0604786N	Offensive Anti-Surface Warfare Weapon Development	04	143,062		143,062	U
98 0605812M	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	04				U
99 0303354N	ASW Systems Development - MIP	04	8,889		8,889	U
100 0304240M	Advanced Tactical Unmanned Aircraft System	04	25,291		25,291	U
101 0304240N	Advanced Tactical Unmanned Aircraft System	04	9,300		9,300	U
102 0304270N	Electronic Warfare Development - MIP	04	466		466	U
	Advanced Component Development & Prototypes		-----	-----	-----	
			4,293,713	33,300	4,327,013	
103 0603208N	Training System Aircraft	05	12,798		12,798	U
104 0604212N	Other Helo Development	05	32,128		32,128	U
105 0604214M	AV-8B Aircraft - Eng Dev	05	46,363		46,363	U
106 0604214N	AV-8B Aircraft - Eng Dev	05				U
107 0604215N	Standards Development	05	3,771		3,771	U
108 0604216N	Multi-Mission Helicopter Upgrade Development	05	16,611		16,611	U
109 0604218N	Air/Ocean Equipment Engineering	05	17,368		17,368	U
110 0604221N	P-3 Modernization Program	05	2,134		2,134	U
111 0604230N	Warfare Support System	05	9,729		9,729	U
112 0604231N	Tactical Command System	05	57,688		57,688	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
113 0604234N	Advanced Hawkeye	05	354,390	292,535	292,535		U
114 0604245M	H-1 Upgrades	05					U
115 0604245N	H-1 Upgrades	05	27,013	61,288	61,288		U
116 0604261N	Acoustic Search Sensors	05	28,940	37,167	37,167		U
117 0604262N	V-22A	05	149,113	171,386	171,386		U
118 0604264N	Air Crew Systems Development	05	8,746	13,235	13,235		U
119 0604269N	EA-18	05	100,825	173,488	173,488		U
120 0604270N	Electronic Warfare Development	05	44,894	54,055	54,055		U
121 0604273M	Executive Helo Development	05					U
122 0604273N	Executive Helo Development	05	327,770	451,938	451,938		U
123 0604274N	Next Generation Jammer (NGJ)	05	559,017	632,936	632,936		U
124 0604280N	Joint Tactical Radio System - Navy (JTRS-Navy)	05	2,295	4,310	4,310		U
125 0604282N	Next Generation Jammer (NGJ) Increment II	05	18,964	66,686	66,686		U
126 0604307N	Surface Combatant Combat System Engineering	05	288,678	390,238	390,238		U
127 0604311N	LPD-17 Class Systems Integration	05	565	689	689		U
128 0604329N	Small Diameter Bomb (SDB)	05	86,989	112,846	112,846		U
129 0604366N	Standard Missile Improvements	05	113,601	158,578	158,578		U
130 0604373N	Airborne MCM	05	44,930	15,734	15,734		U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	FY 2018 Base + OCO + e Emergency		
			P.L.115-96***							
113 0604234N	Advanced Hawkeye	05					292,535		292,535	U
114 0604245M	H-1 Upgrades	05								U
115 0604245N	H-1 Upgrades	05					61,288		61,288	U
116 0604261N	Acoustic Search Sensors	05					37,167		37,167	U
117 0604262N	V-22A	05					171,386		171,386	U
118 0604264N	Air Crew Systems Development	05					13,235		13,235	U
119 0604269N	EA-18	05					173,488		173,488	U
120 0604270N	Electronic Warfare Development	05					54,055		54,055	U
121 0604273M	Executive Helo Development	05								U
122 0604273N	Executive Helo Development	05					451,938		451,938	U
123 0604274N	Next Generation Jammer (NGJ)	05					632,936		632,936	U
124 0604280N	Joint Tactical Radio System - Navy (JTRS-Navy)	05					4,310		4,310	U
125 0604282N	Next Generation Jammer (NGJ) Increment II	05					66,686		66,686	U
126 0604307N	Surface Combatant Combat System Engineering	05					390,238		390,238	U
127 0604311N	LPD-17 Class Systems Integration	05					689		689	U
128 0604329N	Small Diameter Bomb (SDB)	05					112,846		112,846	U
129 0604366N	Standard Missile Improvements	05					158,578		158,578	U
130 0604373N	Airborne MCM	05					15,734		15,734	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
		---	-----	-----	-----	-
113 0604234N	Advanced Hawkeye	05	223,565		223,565	U
114 0604245M	H-1 Upgrades	05	58,097		58,097	U
115 0604245N	H-1 Upgrades	05				U
116 0604261N	Acoustic Search Sensors	05	42,485		42,485	U
117 0604262N	V-22A	05	143,079		143,079	U
118 0604264N	Air Crew Systems Development	05	20,980		20,980	U
119 0604269N	EA-18	05	147,419		147,419	U
120 0604270N	Electronic Warfare Development	05	89,824		89,824	U
121 0604273M	Executive Helo Development	05	245,064		245,064	U
122 0604273N	Executive Helo Development	05				U
123 0604274N	Next Generation Jammer (NGJ)	05	459,529		459,529	U
124 0604280N	Joint Tactical Radio System - Navy (JTRS-Navy)	05	3,272		3,272	U
125 0604282N	Next Generation Jammer (NGJ) Increment II	05	115,253		115,253	U
126 0604307N	Surface Combatant Combat System Engineering	05	397,403		397,403	U
127 0604311N	LPD-17 Class Systems Integration	05	939		939	U
128 0604329N	Small Diameter Bomb (SDB)	05	104,448		104,448	U
129 0604366N	Standard Missile Improvements	05	165,881		165,881	U
130 0604373N	Airborne MCM	05	10,831		10,831	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests+ with CR Adj OCO
131 0604378N	Naval Integrated Fire Control - Counter Air Systems Engineering	05	25,086	25,445	25,445		U
132 0604501N	Advanced Above Water Sensors	05	70,658	87,233	87,233		U
133 0604503N	SSN-688 and Trident Modernization	05	120,261	130,981	130,981		U
134 0604504N	Air Control	05	42,206	75,186	75,186		U
135 0604512N	Shipboard Aviation Systems	05	114,327	177,926	177,926		U
136 0604518N	Combat Information Center Conversion	05	6,092	8,062	8,062		U
137 0604522N	Air and Missile Defense Radar (AMDR) System	05	141,338	32,090	32,090		U
138 0604530N	Advanced Arresting Gear (AAG)	05					U
139 0604558N	New Design SSN	05	127,883	120,087	120,087		U
140 0604562N	Submarine Tactical Warfare System	05	50,069	50,850	50,850		U
141 0604567N	Ship Contract Design/ Live Fire T&E	05	82,946	67,166	67,166		U
142 0604574N	Navy Tactical Computer Resources	05	3,059	4,817	4,817		U
143 0604580N	Virginia Payload Module (VPM)	05	94,846	72,861	72,861		U
144 0604601N	Mine Development	05	14,860	25,635	25,635		U
145 0604610N	Lightweight Torpedo Development	05	29,567	28,076	28,076		U
146 0604654N	Joint Service Explosive Ordnance Development	05	7,369	7,561	7,561		U
147 0604703N	Personnel, Training, Simulation, and Human Factors	05	4,805	40,828	40,828		U
148 0604727N	Joint Standoff Weapon Systems	05	396	435	435		U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	Base + OCO + e Emergency		
			Emergency	-----	-----		-----	-----		
131 0604378N	Naval Integrated Fire Control - Counter Air Systems Engineering	05				25,445			25,445	U
132 0604501N	Advanced Above Water Sensors	05				87,233			87,233	U
133 0604503N	SSN-688 and Trident Modernization	05				130,981			130,981	U
134 0604504N	Air Control	05				75,186			75,186	U
135 0604512N	Shipboard Aviation Systems	05				177,926			177,926	U
136 0604518N	Combat Information Center Conversion	05				8,062			8,062	U
137 0604522N	Air and Missile Defense Radar (AMDR) System	05				32,090			32,090	U
138 0604530N	Advanced Arresting Gear (AAG)	05								U
139 0604558N	New Design SSN	05				120,087			120,087	U
140 0604562N	Submarine Tactical Warfare System	05				50,850			50,850	U
141 0604567N	Ship Contract Design/ Live Fire T&E	05				67,166			67,166	U
142 0604574N	Navy Tactical Computer Resources	05				4,817			4,817	U
143 0604580N	Virginia Payload Module (VPM)	05				72,861			72,861	U
144 0604601N	Mine Development	05				25,635			25,635	U
145 0604610N	Lightweight Torpedo Development	05				28,076			28,076	U
146 0604654N	Joint Service Explosive Ordnance Development	05				7,561			7,561	U
147 0604703N	Personnel, Training, Simulation, and Human Factors	05				40,828			40,828	U
148 0604727N	Joint Standoff Weapon Systems	05				435			435	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
		---	-----	-----	-----	-
131 0604378N	Naval Integrated Fire Control - Counter Air Systems Engineering	05	33,429		33,429	U
132 0604501N	Advanced Above Water Sensors	05	35,635		35,635	U
133 0604503N	SSN-688 and Trident Modernization	05	126,932		126,932	U
134 0604504N	Air Control	05	62,448		62,448	U
135 0604512N	Shipboard Aviation Systems	05	9,710		9,710	U
136 0604518N	Combat Information Center Conversion	05	19,303		19,303	U
137 0604522N	Air and Missile Defense Radar (AMDR) System	05	27,059		27,059	U
138 0604530N	Advanced Arresting Gear (AAG)	05	184,106		184,106	U
139 0604558N	New Design SSN	05	148,233		148,233	U
140 0604562N	Submarine Tactical Warfare System	05	60,824		60,824	U
141 0604567N	Ship Contract Design/ Live Fire T&E	05	60,062		60,062	U
142 0604574N	Navy Tactical Computer Resources	05	4,642		4,642	U
143 0604580N	Virginia Payload Module (VPM)	05				U
144 0604601N	Mine Development	05	25,756		25,756	U
145 0604610N	Lightweight Torpedo Development	05	95,147		95,147	U
146 0604654N	Joint Service Explosive Ordnance Development	05	7,107		7,107	U
147 0604703N	Personnel, Training, Simulation, and Human Factors	05	6,539		6,539	U
148 0604727N	Joint Standoff Weapon Systems	05	441		441	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO
149 0604755N	Ship Self Defense (Detect & Control)	05	133,452	161,713	161,713	U
150 0604756N	Ship Self Defense (Engage: Hard Kill)	05	115,081	212,412	212,412	U
151 0604757N	Ship Self Defense (Engage: Soft Kill/EW)	05	108,630	103,391	103,391	U
152 0604761N	Intelligence Engineering	05	9,029	34,855	34,855	U
153 0604771N	Medical Development	05	24,510	9,353	9,353	U
154 0604777N	Navigation/ID System	05	41,905	92,546	92,546	U
155 0604800M	Joint Strike Fighter (JSF) - EMD	05	519,393	152,934	152,934	U
156 0604800N	Joint Strike Fighter (JSF) - EMD	05	512,662	108,931	108,931	U
157 0604810M	Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps	05	29,691	144,958	144,958	U
158 0604810N	Joint Strike Fighter Follow On Modernization (FoM) - Navy	05	25,041	143,855	143,855	U
159 0605013M	Information Technology Development	05	3,744	14,865	14,865	U
160 0605013N	Information Technology Development	05	87,469	152,977	152,977	U
161 0605024N	Anti-Tamper Technology Support	05	500	3,410	3,410	U
162 0605212M	CH-53K RDTE	05				U
163 0605212N	CH-53K RDTE	05	339,101	340,758	340,758	U
164 0605215N	Mission Planning	05	32,876	33,430	33,430	U
165 0605217N	Common Avionics	05	42,711	58,163	58,163	U
166 0605220N	Ship to Shore Connector (SSC)	05	12,588	22,410	22,410	U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B Base + OCO + MDDE + Ship Emergency** Repairs	Base + OCO + Emergency		
			Emergency	-----	-----		-----	-----		
149 0604755N	Ship Self Defense (Detect & Control)	05					161,713		161,713	U
150 0604756N	Ship Self Defense (Engage: Hard Kill)	05					212,412		212,412	U
151 0604757N	Ship Self Defense (Engage: Soft Kill/EW)	05					103,391		103,391	U
152 0604761N	Intelligence Engineering	05					34,855		34,855	U
153 0604771N	Medical Development	05					9,353		9,353	U
154 0604777N	Navigation/ID System	05					92,546		92,546	U
155 0604800M	Joint Strike Fighter (JSF) - EMD	05					152,934		152,934	U
156 0604800N	Joint Strike Fighter (JSF) - EMD	05					108,931		108,931	U
157 0604810M	Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps	05					144,958		144,958	U
158 0604810N	Joint Strike Fighter Follow On Modernization (FoM) - Navy	05					143,855		143,855	U
159 0605013M	Information Technology Development	05					14,865		14,865	U
160 0605013N	Information Technology Development	05					152,977		152,977	U
161 0605024N	Anti-Tamper Technology Support	05					3,410		3,410	U
162 0605212M	CH-53K RDTE	05								U
163 0605212N	CH-53K RDTE	05					340,758		340,758	U
164 0605215N	Mission Planning	05					33,430		33,430	U
165 0605217N	Common Avionics	05					58,163		58,163	U
166 0605220N	Ship to Shore Connector (SSC)	05					22,410		22,410	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
---	----	---	-----	-----	-----	-
149 0604755N	Ship Self Defense (Detect & Control)	05	180,391	1,100	181,491	U
150 0604756N	Ship Self Defense (Engage: Hard Kill)	05	178,538		178,538	U
151 0604757N	Ship Self Defense (Engage: Soft Kill/EW)	05	120,507		120,507	U
152 0604761N	Intelligence Engineering	05	29,715		29,715	U
153 0604771N	Medical Development	05	8,095		8,095	U
154 0604777N	Navigation/ID System	05	121,026		121,026	U
155 0604800M	Joint Strike Fighter (JSF) - EMD	05	66,566		66,566	U
156 0604800N	Joint Strike Fighter (JSF) - EMD	05	65,494		65,494	U
157 0604810M	Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps	05				U
158 0604810N	Joint Strike Fighter Follow On Modernization (FoM) - Navy	05				U
159 0605013M	Information Technology Development	05	14,005		14,005	U
160 0605013N	Information Technology Development	05	268,567		268,567	U
161 0605024N	Anti-Tamper Technology Support	05	5,618		5,618	U
162 0605212M	CH-53K RDTE	05	326,945		326,945	U
163 0605212N	CH-53K RDTE	05				U
164 0605215N	Mission Planning	05	32,714		32,714	U
165 0605217N	Common Avionics	05	51,486		51,486	U
166 0605220N	Ship to Shore Connector (SSC)	05	1,444		1,444	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total with CR Adj Base	PB Requests* with CR Adj Base	PB Request with CR Adj OCO
167 0605327N	T-AO 205 Class	05	1,062	1,961	1,961		U
168 0605414N	Unmanned Carrier Aviation (UCA)	05	75,863	222,208	222,208		U
169 0605450M	Joint Air-to-Ground Missile (JAGM)	05					U
170 0605450N	Joint Air-to-Ground Missile (JAGM)	05	17,834	15,473	15,473		U
171 0605500N	Multi-mission Maritime Aircraft (MMA)	05	61,959	11,795	11,795		U
172 0605504N	Multi-Mission Maritime (MMA) Increment III	05	109,827	181,731	181,731		U
173 0605611M	Marine Corps Assault Vehicles System Development & Demonstration	05		178,993	178,993		U
174 0605813M	Joint Light Tactical Vehicle (JLTV) System Development & Demonstration	05		20,710	20,710		U
175 0204202N	DDG-1000	05	45,187	140,500	140,500		U
176 0303267N	Auctioned Spectrum Relocation Fund***05		251,203				U
177 0303367N	Spectrum Access Research and Development***	05	46,902				U
178 0303467N	SENSR Spectrum Pipeline SRF***	05	150				U
179 0304231N	Tactical Command System - MIP	05	676				U
180 0304785N	Tactical Cryptologic Systems	05	34,038	28,311	28,311		U
181 0305124N	Special Applications Program	05	35,002				U
182 0306250M	Cyber Operations Technology Development	05	2,349	4,502	4,502		U
System Development & Demonstration			5,928,185	6,362,102	6,362,102		5,400

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B Base + OCO + MDDE + Ship Emergency**	Base + OCO + Emergency		
			Emergency	-----	-----		-----	-----		
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167 0605327N	T-AO 205 Class	05				1,961			1,961	U
168 0605414N	Unmanned Carrier Aviation (UCA)	05				222,208			222,208	U
169 0605450M	Joint Air-to-Ground Missile (JAGM)	05								U
170 0605450N	Joint Air-to-Ground Missile (JAGM)	05				15,473			15,473	U
171 0605500N	Multi-mission Maritime Aircraft (MMA)	05				11,795			11,795	U
172 0605504N	Multi-Mission Maritime (MMA) Increment III	05				181,731			181,731	U
173 0605611M	Marine Corps Assault Vehicles System Development & Demonstration	05				178,993			178,993	U
174 0605813M	Joint Light Tactical Vehicle (JLTV) System Development & Demonstration	05				20,710			20,710	U
175 0204202N	DDG-1000	05				140,500			140,500	U
176 0303267N	Auctioned Spectrum Relocation Fund***05									U
177 0303367N	Spectrum Access Research and Development***	05								U
178 0303467N	SENSR Spectrum Pipeline SRF***	05								U
179 0304231N	Tactical Command System - MIP	05								U
180 0304785N	Tactical Cryptologic Systems	05				28,311			28,311	U
181 0305124N	Special Applications Program	05								U
182 0306250M	Cyber Operations Technology Development	05				4,502			4,502	U
			-----	-----	-----	6,367,502			6,367,502	

System Development & Demonstration

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c
-- -----	----	---	-----	-----	-----	-
167 0605327N	T-AO 205 Class	05	1,298		1,298	U
168 0605414N	Unmanned Carrier Aviation (UCA)	05	718,942		718,942	U
169 0605450M	Joint Air-to-Ground Missile (JAGM)	05	6,759		6,759	U
170 0605450N	Joint Air-to-Ground Missile (JAGM)	05				U
171 0605500N	Multi-mission Maritime Aircraft (MMA)	05	37,296		37,296	U
172 0605504N	Multi-Mission Maritime (MMA) Increment III	05	160,389		160,389	U
173 0605611M	Marine Corps Assault Vehicles System Development & Demonstration	05	98,223		98,223	U
174 0605813M	Joint Light Tactical Vehicle (JLTV) System Development & Demonstration	05	2,260		2,260	U
175 0204202N	DDG-1000	05	161,264		161,264	U
176 0303267N	Auctioned Spectrum Relocation Fund***05					U
177 0303367N	Spectrum Access Research and Development***	05				U
178 0303467N	SENSR Spectrum Pipeline SRF***	05				U
179 0304231N	Tactical Command System - MIP	05				U
180 0304785N	Tactical Cryptologic Systems	05	44,098		44,098	U
181 0305124N	Special Applications Program	05				U
182 0306250M	Cyber Operations Technology Development	05	6,808		6,808	U
	System Development & Demonstration		6,042,480	1,100	6,043,580	

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO
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183 0604256N	Threat Simulator Development	06	16,581	91,819	91,819	U
184 0604258N	Target Systems Development	06	34,021	23,053	23,053	U
185 0604759N	Major T&E Investment	06	51,375	52,634	52,634	U
186 0605126N	Joint Theater Air and Missile Defense Organization	06	2,888	141	141	U
187 0605152N	Studies and Analysis Support - Navy	06	3,861	3,917	3,917	U
188 0605154N	Center for Naval Analyses	06	43,532	50,432	50,432	U
189 0605285N	Next Generation Fighter	06	1,394			U
190 0605502N	Small Business Innovative Research	06	370,665			U
191 0605804N	Technical Information Services	06	1,494	782	782	U
192 0605853N	Management, Technical & International Support	06	97,939	94,562	94,562	U
193 0605856N	Strategic Technical Support	06	3,460	4,313	4,313	U
194 0605861N	RDT&E Science and Technology Management	06	62,961	1,104	1,104	U
195 0605863N	RDT&E Ship and Aircraft Support	06	105,693	105,666	105,666	U
196 0605864N	Test and Evaluation Support	06	398,972	373,667	373,667	U
197 0605865N	Operational Test and Evaluation Capability	06	17,984	20,298	20,298	U
198 0605866N	Navy Space and Electronic Warfare (SEW) Support	06	9,658	17,341	17,341	U
199 0605867N	SEW Surveillance/Reconnaissance Support	06	6,500			U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B Base + OCO + MDDE + Ship Repairs	FY 2018 Base + OCO + Emergency		
			Emergency	-----	-----		-----	-----		
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183 0604256N	Threat Simulator Development	06				91,819			91,819	U
184 0604258N	Target Systems Development	06				23,053			23,053	U
185 0604759N	Major T&E Investment	06				52,634			52,634	U
186 0605126N	Joint Theater Air and Missile Defense Organization	06				141			141	U
187 0605152N	Studies and Analysis Support - Navy	06				3,917			3,917	U
188 0605154N	Center for Naval Analyses	06				50,432			50,432	U
189 0605285N	Next Generation Fighter	06								U
190 0605502N	Small Business Innovative Research	06								U
191 0605804N	Technical Information Services	06				782			782	U
192 0605853N	Management, Technical & International Support	06				94,562			94,562	U
193 0605856N	Strategic Technical Support	06				4,313			4,313	U
194 0605861N	RDT&E Science and Technology Management	06				1,104			1,104	U
195 0605863N	RDT&E Ship and Aircraft Support	06				105,666			105,666	U
196 0605864N	Test and Evaluation Support	06				373,667			373,667	U
197 0605865N	Operational Test and Evaluation Capability	06				20,298			20,298	U
198 0605866N	Navy Space and Electronic Warfare (SEW) Support	06				17,341			17,341	U
199 0605867N	SEW Surveillance/Reconnaissance Support	06								U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
-- -----	----	---	-----	-----	-----	-
183 0604256N	Threat Simulator Development	06	94,576		94,576	U
184 0604258N	Target Systems Development	06	10,981		10,981	U
185 0604759N	Major T&E Investment	06	77,014		77,014	U
186 0605126N	Joint Theater Air and Missile Defense Organization	06	48		48	U
187 0605152N	Studies and Analysis Support - Navy	06	3,942		3,942	U
188 0605154N	Center for Naval Analyses	06	48,797		48,797	U
189 0605285N	Next Generation Fighter	06	5,000		5,000	U
190 0605502N	Small Business Innovative Research	06				U
191 0605804N	Technical Information Services	06	1,029		1,029	U
192 0605853N	Management, Technical & International Support	06	87,565		87,565	U
193 0605856N	Strategic Technical Support	06	4,231		4,231	U
194 0605861N	RDT&E Science and Technology Management	06	1,072		1,072	U
195 0605863N	RDT&E Ship and Aircraft Support	06	97,471		97,471	U
196 0605864N	Test and Evaluation Support	06	373,834		373,834	U
197 0605865N	Operational Test and Evaluation Capability	06	21,554		21,554	U
198 0605866N	Navy Space and Electronic Warfare (SEW) Support	06	16,227		16,227	U
199 0605867N	SEW Surveillance/Reconnaissance Support	06				U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests+ with CR Adj OCO
200 0605873M	Marine Corps Program Wide Support	06	19,142	21,751	21,751		U
201 0605898N	Management HQ - R&D	06	16,188	44,279	44,279		U
202 0606355N	Warfare Innovation Management	06	14,846	28,841	28,841		U
203 0606942M	Assessments and Evaluations Cyber Vulnerabilities	06					U
204 0606942N	Assessments and Evaluations Cyber Vulnerabilities	06					U
205 0305327N	Insider Threat	06					U
206 0902498N	Management Headquarters (Departmental Support Activities)	06		1,749	1,749		U
207 0909999N	Financing for Cancelled Account Adjustments	06	136				U
208 1206867N	SEW Surveillance/Reconnaissance Support	06		9,408	9,408		U
Management Support			-----	-----	-----	-----	-----
			1,279,290	945,757	945,757		
210 0604227N	HARPOON Modifications	07					U
211 0604840M	F-35 C2D2	07					U
212 0604840N	F-35 C2D2	07					U
213 0607658N	Cooperative Engagement Capability (CEC)	07	75,099	92,571	92,571		U
214 0607700N	Deployable Joint Command and Control	07	2,935	3,137	3,137		U
215 0101221N	Strategic Sub & Weapons System Support	07	130,364	135,219	135,219		U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	Base + OCO + Base + OCO + e		
			Emergency	-----	-----		-----	-----		
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200 0605873M	Marine Corps Program Wide Support	06				21,751			21,751	U
201 0605898N	Management HQ - R&D	06				44,279			44,279	U
202 0606355N	Warfare Innovation Management	06				28,841			28,841	U
203 0606942M	Assessments and Evaluations Cyber Vulnerabilities	06								U
204 0606942N	Assessments and Evaluations Cyber Vulnerabilities	06								U
205 0305327N	Insider Threat	06								U
206 0902498N	Management Headquarters (Departmental Support Activities)	06				1,749			1,749	U
207 0909999N	Financing for Cancelled Account Adjustments	06								U
208 1206867N	SEW Surveillance/Reconnaissance Support	06				9,408			9,408	U
Management Support			-----	-----	-----	945,757			945,757	
210 0604227N	HARPOON Modifications	07								U
211 0604840M	F-35 C2D2	07								U
212 0604840N	F-35 C2D2	07								U
213 0607658N	Cooperative Engagement Capability (CEC)	07				92,571			92,571	U
214 0607700N	Deployable Joint Command and Control	07				3,137			3,137	U
215 0101221N	Strategic Sub & Weapons System Support	07				135,219			135,219	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
---	----	---	-----	-----	-----	-
200 0605873M	Marine Corps Program Wide Support	06	24,303		24,303	U
201 0605898N	Management HQ - R&D	06	43,262		43,262	U
202 0606355N	Warfare Innovation Management	06	41,918		41,918	U
203 0606942M	Assessments and Evaluations Cyber Vulnerabilities	06	7,000		7,000	U
204 0606942N	Assessments and Evaluations Cyber Vulnerabilities	06	48,800		48,800	U
205 0305327N	Insider Threat	06	1,682		1,682	U
206 0902498N	Management Headquarters (Departmental Support Activities)	06	1,579		1,579	U
207 0909999N	Financing for Cancelled Account Adjustments	06				U
208 1206867N	SEW Surveillance/Reconnaissance Support	06	8,684		8,684	U
	Management Support		-----	-----	-----	
			1,020,569		1,020,569	
210 0604227N	HARPOON Modifications	07	5,426		5,426	U
211 0604840M	F-35 C2D2	07	259,122		259,122	U
212 0604840N	F-35 C2D2	07	252,360		252,360	U
213 0607658N	Cooperative Engagement Capability (CEC)	07	130,515		130,515	U
214 0607700N	Deployable Joint Command and Control	07	3,127		3,127	U
215 0101221N	Strategic Sub & Weapons System Support	07	157,679		157,679	U

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Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests+ with CR Adj OCO
216 0101224N	SSBN Security Technology Program	07	32,910	36,242	36,242		U
217 0101226N	Submarine Acoustic Warfare Development	07	7,300	12,053	12,053		U
218 0101402N	Navy Strategic Communications	07	16,753	18,221	18,221		U
219 0204136N	F/A-18 Squadrons	07	169,473	224,470	224,470		U
220 0204163N	Fleet Telecommunications (Tactical)	07	38,949	33,525	33,525		U
221 0204228N	Surface Support	07	20,595	24,829	24,829		U
222 0204229N	Tomahawk and Tomahawk Mission Planning Center (TMPC)	07	49,149	133,617	133,617		U
223 0204311N	Integrated Surveillance System	07	57,043	38,972	38,972	11,600	11,600 U
224 0204313N	Ship-Towed Array Surveillance Systems	07					U
225 0204413N	Amphibious Tactical Support Units (Displacement Craft)	07	11,143	3,940	3,940		U
226 0204460M	Ground/Air Task Oriented Radar (G/ATOR)	07	78,860	54,645	54,645		U
227 0204571N	Consolidated Training Systems Development	07	44,435	66,518	66,518		U
228 0204574N	Cryptologic Direct Support	07	1,122	1,155	1,155	1,200	1,200 U
229 0204575N	Electronic Warfare (EW) Readiness Support	07	79,410	51,040	51,040		U
230 0205601N	HARM Improvement	07	32,889	87,989	87,989		U
231 0205604N	Tactical Data Links	07	121,396	89,852	89,852		U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	FY 2018 Base + OCO + e Emergency		
216 0101224N	SSBN Security Technology Program	07					36,242		36,242	U
217 0101226N	Submarine Acoustic Warfare Development	07					12,053		12,053	U
218 0101402N	Navy Strategic Communications	07					18,221		18,221	U
219 0204136N	F/A-18 Squadrons	07					224,470		224,470	U
220 0204163N	Fleet Telecommunications (Tactical)	07					33,525		33,525	U
221 0204228N	Surface Support	07					24,829		24,829	U
222 0204229N	Tomahawk and Tomahawk Mission Planning Center (TMPC)	07					133,617		133,617	U
223 0204311N	Integrated Surveillance System	07					50,572		50,572	U
224 0204313N	Ship-Towed Array Surveillance Systems	07								U
225 0204413N	Amphibious Tactical Support Units (Displacement Craft)	07					3,940		3,940	U
226 0204460M	Ground/Air Task Oriented Radar (G/ATOR)	07					54,645		54,645	U
227 0204571N	Consolidated Training Systems Development	07					66,518		66,518	U
228 0204574N	Cryptologic Direct Support	07					2,355		2,355	U
229 0204575N	Electronic Warfare (EW) Readiness Support	07					51,040		51,040	U
230 0205601N	HARM Improvement	07					87,989		87,989	U
231 0205604N	Tactical Data Links	07					89,852		89,852	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
	----	---	-----	-----	-----	-
216 0101224N	SSBN Security Technology Program	07	43,198		43,198	U
217 0101226N	Submarine Acoustic Warfare Development	07	11,311		11,311	U
218 0101402N	Navy Strategic Communications	07	39,313		39,313	U
219 0204136N	F/A-18 Squadrons	07	193,086		193,086	U
220 0204163N	Fleet Telecommunications (Tactical)	07	25,014		25,014	U
221 0204228N	Surface Support	07	11,661		11,661	U
222 0204229N	Tomahawk and Tomahawk Mission Planning Center (TMPC)	07	282,395		282,395	U
223 0204311N	Integrated Surveillance System	07	36,959		36,959	U
224 0204313N	Ship-Towed Array Surveillance Systems	07	15,454		15,454	U
225 0204413N	Amphibious Tactical Support Units (Displacement Craft)	07	6,073		6,073	U
226 0204460M	Ground/Air Task Oriented Radar (G/ATOR)	07	45,029		45,029	U
227 0204571N	Consolidated Training Systems Development	07	104,903		104,903	U
228 0204574N	Cryptologic Direct Support	07	4,544		4,544	U
229 0204575N	Electronic Warfare (EW) Readiness Support	07	66,889		66,889	U
230 0205601N	HARM Improvement	07	120,762		120,762	U
231 0205604N	Tactical Data Links	07	104,696		104,696	U

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			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
232 0205620N	Surface ASW Combat System Integration	07	23,779	29,351	29,351		U
233 0205632N	MK-48 ADCAP	07	48,507	68,553	68,553		U
234 0205633N	Aviation Improvements	07	121,138	119,099	119,099		U
235 0205675N	Operational Nuclear Power Systems	07	101,786	127,445	127,445		U
236 0206313M	Marine Corps Communications Systems	07	141,171	123,825	123,825		U
237 0206335M	Common Aviation Command and Control System (CAC2S)	07	6,934	7,343	7,343		U
238 0206623M	Marine Corps Ground Combat/ Supporting Arms Systems	07	45,877	66,009	66,009		U
239 0206624M	Marine Corps Combat Services Support	07	11,639	25,258	25,258		U
240 0206625M	USMC Intelligence/Electronic Warfare Systems (MIP)	07	22,978	30,886	30,886		U
241 0206629M	Amphibious Assault Vehicle	07	36,571	58,728	58,728		U
242 0207161N	Tactical AIM Missiles	07	54,678	42,884	42,884		U
243 0207163N	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	34,010	25,364	25,364		U
244 0219902M	Global Combat Support System - Marine Corps (GCSS-MC)	07	9,128				U
248 0303109N	Satellite Communications (SPACE)	07	30,826				U
249 0303138N	Consolidated Afloat Network Enterprise Services (CANES)	07	23,224	24,271	24,271		U
250 0303140N	Information Systems Security Program	07	32,708	50,269	50,269		U

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			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	Base + OCO + e Emergency	Base + OCO + e Emergency	
			Emergency	-----	-----		-----	-----	-----	
232 0205620N	Surface ASW Combat System Integration	07				29,351			29,351	U
233 0205632N	MK-48 ADCAP	07				68,553			68,553	U
234 0205633N	Aviation Improvements	07				119,099			119,099	U
235 0205675N	Operational Nuclear Power Systems	07				127,445			127,445	U
236 0206313M	Marine Corps Communications Systems	07				123,825			123,825	U
237 0206335M	Common Aviation Command and Control System (CAC2S)	07				7,343			7,343	U
238 0206623M	Marine Corps Ground Combat/ Supporting Arms Systems	07				66,009			66,009	U
239 0206624M	Marine Corps Combat Services Support	07				25,258			25,258	U
240 0206625M	USMC Intelligence/Electronic Warfare Systems (MIP)	07				30,886			30,886	U
241 0206629M	Amphibious Assault Vehicle	07				58,728			58,728	U
242 0207161N	Tactical AIM Missiles	07				42,884			42,884	U
243 0207163N	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07				25,364			25,364	U
244 0219902M	Global Combat Support System - Marine Corps (GCSS-MC)	07								U
248 0303109N	Satellite Communications (SPACE)	07								U
249 0303138N	Consolidated Afloat Network Enterprise Services (CANES)	07				24,271			24,271	U
250 0303140N	Information Systems Security Program	07				50,269			50,269	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
---	----	---	-----	-----	-----	-
232 0205620N	Surface ASW Combat System Integration	07	28,421		28,421	U
233 0205632N	MK-48 ADCAP	07	94,155		94,155	U
234 0205633N	Aviation Improvements	07	121,805		121,805	U
235 0205675N	Operational Nuclear Power Systems	07	117,028		117,028	U
236 0206313M	Marine Corps Communications Systems	07	174,779	16,130	190,909	U
237 0206335M	Common Aviation Command and Control System (CAC2S)	07	4,826		4,826	U
238 0206623M	Marine Corps Ground Combat/ Supporting Arms Systems	07	97,152		97,152	U
239 0206624M	Marine Corps Combat Services Support	07	30,156		30,156	U
240 0206625M	USMC Intelligence/Electronic Warfare Systems (MIP)	07	39,976		39,976	U
241 0206629M	Amphibious Assault Vehicle	07	22,637		22,637	U
242 0207161N	Tactical AIM Missiles	07	40,121		40,121	U
243 0207163N	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	32,473		32,473	U
244 0219902M	Global Combat Support System - Marine Corps (GCSS-MC)	07				U
248 0303109N	Satellite Communications (SPACE)	07				U
249 0303138N	Consolidated Afloat Network Enterprise Services (CANES)	07	23,697		23,697	U
250 0303140N	Information Systems Security Program	07	44,228		44,228	U

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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	Base	Total with CR Adj	Base	Total with CR Adj
252 0305192N	Military Intelligence Program (MIP) Activities	07	6,019	6,352	6,352		U
253 0305204N	Tactical Unmanned Aerial Vehicles	07	8,436	7,770	7,770		U
254 0305205N	UAS Integration and Interoperability	07	21,543	39,736	39,736		U
255 0305208M	Distributed Common Ground/Surface Systems	07	2,079	12,867	12,867		U
256 0305208N	Distributed Common Ground/Surface Systems	07	44,564	46,150	46,150		U
257 0305220N	MQ-4C Triton	07	113,606	84,115	84,115		U
258 0305231N	MQ-8 UAV	07	26,518	62,656	62,656		U
259 0305232M	RQ-11 UAV	07		2,022	2,022		U
260 0305234N	Small (Level 0) Tactical UAS (STUASL0)	07	5,071	4,835	4,835		U
261 0305239M	RQ-21A	07	8,379	8,899	8,899		U
262 0305241N	Multi-Intelligence Sensor Development	07	64,765	99,020	99,020		U
263 0305242M	Unmanned Aerial Systems (UAS) Payloads (MIP)	07	11,181	18,578	18,578		U
264 0305421N	RQ-4 Modernization	07	144,477	229,404	229,404		U
265 0308601N	Modeling and Simulation Support	07	4,529	5,238	5,238		U
266 0702207N	Depot Maintenance (Non-IF)	07	37,089	38,227	38,227		U
267 0708730N	Maritime Technology (MARITECH)	07	3,080	4,808	4,808		U

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Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req with CR Adj S
			FY 2018 Emergency Requests**	Div B MDDE + Ship Repairs	FY 2018 Remaining Req Emergency		DIV B MDDE + Ship Repairs	Base + OCO + e		
			Emergency	Repairs	Emergency		Emergency**	Emergency		
--	----	---	-----	-----	-----	-----	-----	-----	-----	-
252 0305192N	Military Intelligence Program (MIP) Activities	07				6,352			6,352	U
253 0305204N	Tactical Unmanned Aerial Vehicles	07				7,770			7,770	U
254 0305205N	UAS Integration and Interoperability	07				39,736			39,736	U
255 0305208M	Distributed Common Ground/Surface Systems	07				12,867			12,867	U
256 0305208N	Distributed Common Ground/Surface Systems	07				46,150			46,150	U
257 0305220N	MQ-4C Triton	07				84,115			84,115	U
258 0305231N	MQ-8 UAV	07				62,656			62,656	U
259 0305232M	RQ-11 UAV	07				2,022			2,022	U
260 0305234N	Small (Level 0) Tactical UAS (STUASL0)	07				4,835			4,835	U
261 0305239M	RQ-21A	07				8,899			8,899	U
262 0305241N	Multi-Intelligence Sensor Development	07				99,020			99,020	U
263 0305242M	Unmanned Aerial Systems (UAS) Payloads (MIP)	07				18,578			18,578	U
264 0305421N	RQ-4 Modernization	07				229,404			229,404	U
265 0308601N	Modeling and Simulation Support	07				5,238			5,238	U
266 0702207N	Depot Maintenance (Non-IF)	07				38,227			38,227	U
267 0708730N	Maritime Technology (MARITECH)	07				4,808			4,808	U

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Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
---	----	---	-----	-----	-----	-
252 0305192N	Military Intelligence Program (MIP) Activities	07	6,081		6,081	U
253 0305204N	Tactical Unmanned Aerial Vehicles	07	8,529		8,529	U
254 0305205N	UAS Integration and Interoperability	07	41,212		41,212	U
255 0305208M	Distributed Common Ground/Surface Systems	07	7,687		7,687	U
256 0305208N	Distributed Common Ground/Surface Systems	07	42,846		42,846	U
257 0305220N	MQ-4C Triton	07	14,395		14,395	U
258 0305231N	MQ-8 UAV	07	9,843		9,843	U
259 0305232M	RQ-11 UAV	07	524		524	U
260 0305234N	Small (Level 0) Tactical UAS (STUASL0)	07	5,360		5,360	U
261 0305239M	RQ-21A	07	10,914		10,914	U
262 0305241N	Multi-Intelligence Sensor Development	07	81,231		81,231	U
263 0305242M	Unmanned Aerial Systems (UAS) Payloads (MIP)	07	5,956		5,956	U
264 0305421N	RQ-4 Modernization	07	219,894		219,894	U
265 0308601N	Modeling and Simulation Support	07	7,097		7,097	U
266 0702207N	Depot Maintenance (Non-IF)	07	36,560		36,560	U
267 0708730N	Maritime Technology (MARITECH)	07	7,284		7,284	U

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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj	PB Request with CR Adj Base	Total PB Requests+ with CR Adj OCO
268 1203109N	Satellite Communications (SPACE)	07		37,836	37,836		U
9999 999999999	Classified Programs		1,602,086	1,364,347	1,364,347	89,855	89,855 U
	Operational Systems Development		3,818,201	3,980,140	3,980,140	102,655	102,655
269 0901560N	Continuing Resolution Programs	20		-558,059	-558,059	196,172	158,972 U
	Undistributed			-558,059	-558,059	196,172	158,972
Total Research, Development, Test & Eval, Navy			17,851,955	17,116,976	17,091,976	326,537	326,537

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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req S
			FY 2018 Emergency	Div B P.L.115-96***	FY 2018 MDDE + Ship Remaining Req		Total	Less Enacted DIV B	Base + OCO + MDDE + Ship	
			Emergency	Repairs	Emergency		Emergency**	Repairs	Base + OCO + Emergency	
268 1203109N	Satellite Communications (SPACE)	07				37,836			37,836	U
9999 999999999	Classified Programs		60,000	-60,000		1,514,202		-60,000	1,454,202	U
	Operational Systems Development					4,142,795			4,082,795	
269 0901560N	Continuing Resolution Programs	20				-399,087			-399,087	U
	Undistributed					-399,087			-399,087	
	Total Research, Development, Test & Eval, Navy					17,478,513			17,418,513	

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Appropriation: 1319N Research, Development, Test & Eval, Navy

Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
		---	-----	-----	-----	-
268 1203109N	Satellite Communications (SPACE)	07	39,174		39,174	U
9999 999999999	Classified Programs		1,518,903	147,882	1,666,785	U
	Operational Systems Development		4,854,460	164,012	5,018,472	
269 0901560N	Continuing Resolution Programs	20	-----	-----	-----	U
	Undistributed		-----	-----	-----	
Total Research, Development, Test & Eval, Navy			18,451,066	198,412	18,649,478	

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Summary Recap of Budget Activities					
Research and Development	7,237	18,622	18,622		
Total Research, Development, Test & Evaluation	7,237	18,622	18,622		
Summary Recap of Non-RDT&E Title FYDP Programs					
Mobility Forces	7,237	18,622	18,622		
Total Research, Development, Test & Evaluation	7,237	18,622	18,622		

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	FY 2018			FY 2018			FY 2018		
	Less Enacted		FY 2018	Total		Less Enacted	FY 2018	Remaining Req	
	FY 2018	Div B	P.B Requests*	with CR Adj	P.L.115-96***	DIV B	with CR Adj	Base + OCO +	Emergency**
Summary Recap of Budget Activities	Emergency Requests**	P.L.115-96*** MDDE + Ship Emergency	FY 2018 Remaining Req Repairs	P.B Requests* with CR Adj Base + OCO + Emergency**		P.L.115-96*** MDDE + Ship Emergency		Base + OCO + Emergency	
Research and Development					18,622			18,622	
Total Research, Development, Test & Evaluation					18,622			18,622	
Summary Recap of Non-RDT&E Title FYDP Programs									
Mobility Forces					18,622			18,622	
Total Research, Development, Test & Evaluation					18,622			18,622	

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Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Research and Development			
Total Research, Development, Test & Evaluation			
Summary Recap of Non-RDT&E Title FYDP Programs			
Mobility Forces			
Total Research, Development, Test & Evaluation			

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Appropriation: 4557N National Defense Sealift Fund

Program Line Element No Number	Item	Act	FY 2017	FY 2018	FY 2018	FY 2018	FY 2018
			(Base + OCO)	PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests+ S with CR Adj OCO
1 0408042N	National Defense Sealift Fund	04	7,237	18,622	18,622		U
	Research and Development		7,237	18,622	18,622		
			-----	-----	-----	-----	-----
	Total National Defense Sealift Fund		7,237	18,622	18,622		

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Appropriation: 4557N National Defense Sealift Fund

Program Line Element No Number	Item	Act	FY 2018			PB Requests* with CR Adj	FY 2018			FY 2018 Remaining Req S
			FY 2018 Emergency	Less Enacted Div B P.L.115-96***	FY 2018 MDDE + Ship		Total	Less Enacted DIV B P.L.115-96***	Base + OCO + MDDE + Ship	
			Requests** Emergency	Repairs	Remaining Req Emergency		Base + OCO + Emergency**	Repairs	Emergency	
1 0408042N	National Defense Sealift Fund	04	-----	-----	-----	18,622	-----	-----	18,622 U	
	Research and Development		-----	-----	-----	18,622	-----	-----	18,622	
	Total National Defense Sealift Fund		-----	-----	-----	18,622	-----	-----	18,622	

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Appropriation: 4557N National Defense Sealift Fund

Program Line Element No Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	S e c -
1 0408042N	National Defense Sealift Fund	04	-----	-----	-----	U
	Research and Development		-----	-----	-----	
	Total National Defense Sealift Fund		-----	-----	-----	

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JT Precision Approach & Ldg Sys	0603860N	76	04.....	Volume 2 - 957
JT Service Explosive Ordn Dev	0603654N	61	04.....	Volume 2 - 705
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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603207N / Air/Ocean Tactical Applications								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	571.862	44.175	48.365	29.747	-	29.747	33.642	34.763	34.956	37.582	Continuing	Continuing	
2341: METOC Data Acquisition	167.779	4.268	5.483	3.471	-	3.471	5.238	5.741	5.948	7.859	Continuing	Continuing	
2342: METOC Data Assimilation and Mod	231.124	20.082	21.111	17.441	-	17.441	21.117	21.596	21.495	22.441	Continuing	Continuing	
2343: Tactical METOC Applications	153.449	10.275	11.715	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	175.439	
2344: Precise Time and Astrometry	10.689	4.844	5.190	4.556	-	4.556	2.946	3.006	3.017	3.079	Continuing	Continuing	
2363: Remote Sensing Capability Development	7.355	3.773	3.959	0.324	-	0.324	0.327	0.328	0.328	0.000	0.000	16.394	
3207: Fleet Synthetic Training	1.466	0.933	0.253	0.266	-	0.266	0.283	0.305	0.326	0.332	Continuing	Continuing	
3404: Tactical Environmental Support	0.000	0.000	0.327	2.595	-	2.595	2.616	2.643	2.671	2.685	Continuing	Continuing	
3405: Decision Support Products & Dissemination	0.000	0.000	0.327	1.094	-	1.094	1.115	1.144	1.171	1.186	Continuing	Continuing	

A. Mission Description and Budget Item Justification

The Air Tactical Applications (AOTA) Program Element is aligned with the Navy's maritime strategy to enhance the future mission capabilities of the Navy-Marine Corps Meteorological and Oceanographic (METOC) Team supporting naval warfighters worldwide. New state-of-the art government and commercial technologies are identified, transitioned, demonstrated and then integrated into Combat Systems and programs of record to provide capabilities that provide real-time and near-real-time operational effects of the physical environment on the performance of combat forces and their new and emerging platforms, sensors, systems and munitions. The AOTA program element focuses on sensing and characterizing and predicting the littoral and deep-strike battlespace in the context of regional conflicts and crisis response scenarios. Projects in this program element transition state-of-the art sensing, assimilation, modeling and decision aid technologies from government and commercial sources. Unique project development efforts include atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in mainframe, desktop and laptop computers. Model data, products and services can be used by forward-deployed personnel or in a reach-back mode to optimize sensor placement and force allocation decisions. Global Geospatial Information and Services efforts within this program address the bathymetric needs of the Navy. Also developed are algorithms to process new satellite sensor data for integration into Navy and Marine Corps decision support systems and for display as part of the common operational and tactical pictures. In addition, the projects provide for demonstration and validation of specialized atmospheric and oceanographic instrumentation and measurement techniques, new sensors, communications and interfaces. Included are new capabilities to assess, predict and enhance the performance of current and emerging undersea warfare and mine warfare weapons systems. AOTA capabilities are designed to support the latest versions of the Global Command and Control System and specific unit-level combat systems. This program element develops technological upgrades for the U.S. Naval

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018																																																																																										
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications																																																																																										
Observatory's Master Clock system to meet requirements of Department of Defense communications, cryptographic, intelligence, geolocation, and targeting systems; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite tracking and space debris studies.																																																																																											
Major emphasis areas include the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) and the METOC Data Acquisition, the METOC Data Assimilation & Modeling, the Precise Timing and Astrometry, the Fleet Synthetic Training, the Tactical Environmental Support, Decision Support Products & Dissemination, the Earth System Prediction Capability projects, and the Remote Sensing Capability Development.																																																																																											
B. Program Change Summary (\$ in Millions) <table> <thead> <tr> <th></th> <th>FY 2017</th> <th>FY 2018</th> <th>FY 2019 Base</th> <th>FY 2019 OCO</th> <th>FY 2019 Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>48.536</td> <td>48.365</td> <td>49.741</td> <td>-</td> <td>49.741</td> </tr> <tr> <td>Current President's Budget</td> <td>44.175</td> <td>48.365</td> <td>29.747</td> <td>-</td> <td>29.747</td> </tr> <tr> <td>Total Adjustments</td> <td>-4.361</td> <td>0.000</td> <td>-19.994</td> <td>-</td> <td>-19.994</td> </tr> <tr> <td> • Congressional General Reductions</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Directed Reductions</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Rescissions</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Adds</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Directed Transfers</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Reprogrammings</td> <td>-0.015</td> <td>0.000</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • SBIR/STTR Transfer</td> <td>-0.746</td> <td>0.000</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Program Adjustments</td> <td>0.000</td> <td>0.000</td> <td>-17.673</td> <td>2.500</td> <td>-15.173</td> </tr> <tr> <td> • Rate/Misc Adjustments</td> <td>0.000</td> <td>0.000</td> <td>-2.321</td> <td>-2.500</td> <td>-4.821</td> </tr> <tr> <td> • Congressional Directed Reductions</td> <td>-3.600</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td> Adjustments</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Previous President's Budget	48.536	48.365	49.741	-	49.741	Current President's Budget	44.175	48.365	29.747	-	29.747	Total Adjustments	-4.361	0.000	-19.994	-	-19.994	• Congressional General Reductions	-	-				• Congressional Directed Reductions	-	-				• Congressional Rescissions	-	-				• Congressional Adds	-	-				• Congressional Directed Transfers	-	-				• Reprogrammings	-0.015	0.000				• SBIR/STTR Transfer	-0.746	0.000				• Program Adjustments	0.000	0.000	-17.673	2.500	-15.173	• Rate/Misc Adjustments	0.000	0.000	-2.321	-2.500	-4.821	• Congressional Directed Reductions	-3.600	-	-	-	-	Adjustments					
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Change Summary Explanation Schedule- 1) The schedule for PTA is updated to reflect the additional required research and upgrades.																																																																																											

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2341 / METOC Data Acquisition			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2341: METOC Data Acquisition	167.779	4.268	5.483	3.471	-	3.471	5.238	5.741	5.948	7.859	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The major work of the Meteorology and Oceanography (METOC) Data Acquisition Project is to provide future mission capabilities to warfighters allowing them to detect and monitor the conditions of the physical environment throughout the entire battlespace. The most promising new sensor technologies (including unmanned vehicles, tactical sensor exploitation, in-situ sensors) are transitioned from the government's and commercial industry's technology base. These new sensor technologies are demonstrated, validated and integrated into operational programs for warfighters. These new sensor capabilities provide timely and accurate METOC data to operational and tactical commanders. METOC data requirements have evolved with emphasis on naval warfare shifting to littoral and deep strike battlespace. The need to accurately characterize dynamic conditions are crucial in planning and executing warfare operations and effectively allocating force weapon and sensor systems. Routinely available data sources, such as climatology, oceanographic and meteorological numerical models are necessary but not sufficient to support the littoral and deep strike regions. Operational sensors are deployed great distances from the target area of interest. The challenge is to collect and disseminate METOC data in variable and dynamic littoral environmental conditions or in denied, remote or inaccessible areas over extended periods of time.

This project: 1) provides the means to rapidly and automatically acquire a broad array of METOC data using off-board and on-board sensors; 2) provides an on-scene assessment capability for the tactical commander; 3) provides the tactical commander with real-time METOC data and products for operational use; 4) demonstrates and validates the use of tactical workstations and desktop computers for processing and display of METOC data and products; 5) demonstrates and validates techniques which employ data compression, connectivity and interface technologies to obtain, store, process, distribute and display these METOC data and products; 6) develops new charting and bathymetric survey techniques necessary to reduce the existing shortfall in coastal hydrographic survey requirements; 7) develops an expanded database for predictive METOC models in areas of interest; and 8) supports the development of radar weather using through-the-sensor techniques. Major emphasis area Tactical Oceanographic Capabilities project.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC) Description: Fleet Naval METOC has updated the definition and structure of the METOC program along the lines of operational mission needs. This update focuses on the operational characteristics of Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) of METOC data and information. Identified efforts supporting METOC are realigned to projects and activities that align to the TCPED updated program structure.	4.061 - Articles: - -	0.000 - Articles: - -	0.000 - Articles: - -	0.000 - Articles: - -	0.000 - Articles: - -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2341 / METOC Data Acquisition				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY2018 funding realigned to sub project METOC Data Acquisition, project unit (PU) 3404 Tactical Environmental Support, and PU 3405 Decision Support Products & Dissemination.						
FY 2018 Plans: NA						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
Title: Tactical Oceanography Capabilities (TOC) / Undersea Warfare (USW) Articles:		0.207	0.000	0.000	0.000	0.000
Description: Fleet Naval METOC has updated the definition and structure of the METOC program along the lines of operational mission needs. This update focuses on the operational characteristics of Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) of METOC data and information. Identified efforts supporting METOC are realigned to projects and activities that align to the TCPED updated program structure. FY2018 funding realigned to sub project METOC Data Acquisition, project unit (PU) 3404 Tactical Environmental Support, and PU 3405 Decision Support Products & Dissemination.		-	-	-	-	-
FY 2018 Plans: NA						
FY 2019 Base Plans: NA						
FY 2019 OCO Plans: NA						
FY 2018 to FY 2019 Increase/Decrease Statement: FY2018 funding realigned to sub project METOC Data Acquisition, project unit (PU) 3404 Tactical Environmental Support, and PU 3405 Decision Support Products & Dissemination.						
Title: Meteorological and Oceanographic (METOC) Data Acquisition Articles:		0.000	5.483	3.471	0.000	3.471

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2341 / METOC Data Acquisition				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Description: Efforts falling within the Meteorology and Oceanography (METOC) Collections Project provide future scientific and technological warfighting capabilities that detect and continuously monitor environmental (atmospheric, sea surface, oceanographic and seabed) conditions throughout the battlespace. The Navy's mission continues to require focus on blue-water operations, littoral and deep-strike (inland) battlespaces. Each of these operating areas (and the transitions between them) has its own dynamic and complex environmental characteristics and behaviors that require modifying METOC Collections and associated sensing strategies and methodologies. Without reliable characterization of ocean and atmosphere in these operating areas, the Navy risks ineffective allocation and employment of warfighters and weapon systems, and the sensors that fully enable them.</p> <p>Fleet Naval METOC has updated the definition and structure of the METOC program along the lines of operational mission needs. This update focuses on the operational characteristics of Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) of METOC data and information. Identified efforts supporting METOC are realigned to projects and activities that align to the TCPED updated program structure.</p> <p>FY2018 funding realigned to project unit (PU) 2341 METOC Data Acquisition from PU 2341 Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC) and Tactical Oceanography Capabilities (TOC)/ Undersea Warfare (USW) and PE 0604218N (Air/Ocean Equipment Engineering) PU 2345. This is not a new Start</p> <p>FY2019 funding in this project is realigned to PU 3404 Tactical Environmental Support for follow-on efforts that will more fully transition tactical environmental technologies into Fleet operations, as well as address operational lessons learned from fielding of recently introduced technologies.</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none">- Continue: Test, validate, and transition new components for data assimilation capabilities for global and mesoscale atmospheric models that address multiple scales.- Begin: Implement a "rapid innovation" weather-ocean capability that emphasizes observing systems.- Continue: Supplement efforts in a FY17-19 Rapid Transition Project to solve the overall Forward ocean data assimilation problem and integrate results into Anti-submarine Warfare Tactical Decision Aids.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2341 / METOC Data Acquisition				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none">- Continue: Provide technical support to passive microwave and weather satellite follow-on remote sensing projects for all phases of pre- and post-launch sensor calibration, algorithm validation, data exploitation, dissemination and quality control of critical synoptic atmospheric and geophysical environmental data products.- Continue: Develop and test a Navy Coupled Ocean Data Assimilation-based capability for forward platforms to assimilate collected oceanographic data into an oceanographic model field in an acoustically consistent way.- Continue: Develop, validate and transition bias correction for extended-range forecasts in the global and regional coupled systems, using information from the satellite observations to measure the bias and guide the correction.- Continue: Collect in-situ transmission loss from tactical platforms in support of a Low Frequency Bottom Loss database.- Continue: Develop a methodology for creating a bottom backscattering database in Deep Water, i.e., water depths deeper than the continental rise, and apply the methodology to regions of operational interest to create a Prototype Deep Ocean Bottom Scattering database.- Begin: Assimilate satellite optical data streams into the Coupled Ocean-Atmosphere Mesoscale Prediction System ocean model component.- Continue: Characterize/assess biological scattering and attenuation at tactical frequencies, known to have a significant impact on mid-frequency active sonar systems.- Complete: Deliver environmental data collected by the P-8 aircraft, to be incorporated into prediction tools.						
<p>FY 2019 Base Plans:</p> <p>Continue all efforts of FY18 less those noted as completed. The effort also plans to focus on each category as described below:</p> <ul style="list-style-type: none">- Continue: Implement a "rapid innovation" weather-ocean capability that emphasizes observing systems.- Continue: Assimilate satellite optical data streams into the Coupled Ocean-Atmosphere Mesoscale Prediction System ocean model component.- Complete: Test, validate, and transition new components for data assimilation capabilities for global and mesoscale atmospheric models that address multiple scales.- Complete: Supplement efforts in a FY17-19 Rapid Transition Project to solve the overall Forward ocean data assimilation problem and integrate results into Anti-submarine Warfare Tactical Decision Aids.- Complete: Provide technical support to passive microwave and weather satellite follow-on remote sensing projects for all phases of pre- and post-launch sensor calibration, algorithm validation, data exploitation, dissemination and quality control of critical synoptic atmospheric and geophysical environmental data products.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018								
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2341 / METOC Data Acquisition								
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
<ul style="list-style-type: none"> - Complete: Develop and test a Navy Coupled Ocean Data Assimilation-based capability for forward platforms to assimilate collected oceanographic data into an oceanographic model field in an acoustically consistent way. - Complete: Develop, validate and transition bias correction for extended-range forecasts in the global and regional coupled systems, using information from the satellite observations to measure the bias and guide the correction. - Complete: Collect in-situ transmission loss from tactical platforms in support of a Low Frequency Bottom Loss database. - Complete: Develop a methodology for creating a bottom backscattering database in Deep Water, i.e., water depths deeper than the continental rise, and apply the methodology to regions of operational interest to create a Prototype Deep Ocean Bottom Scattering database. - Complete: Characterize/assess biological scattering and attenuation at tactical frequencies, known to have a significant impact on mid-frequency active sonar systems. 															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: Funding Decreases from FY18 to FY19 in this project are realigned to PROJ 3404 for follow-on efforts that will more fully transition tactical environmental technologies into Fleet operations, as well as address operational lessons learned from fielding of recently introduced technologies. This feedback mechanism enables agility, thus accelerating the improvement of capabilities that provide a distinct tactical advantage to the Fleet and Marine Corps.															
Accomplishments/Planned Programs Subtotals							4.268	5.483	3.471	0.000	3.471				
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• RDTEN/0604218N/2345: <i>FLEET METOC EQUIPMENT</i>	2.222	2.411	2.438	-	2.438	2.456	2.505	0.000	0.000	Continuing	Continuing				
Remarks															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2341 / METOC Data Acquisition
D. Acquisition Strategy Acquisition, management and contracting strategies are to support the Meteorological and Oceanographic (METOC) Data Acquisition Project to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander, all with management oversight by the Navy.		
E. Performance Metrics Goal: Develop techniques and tools to acquire Meteorological and Oceanographic (METOC) data to improve the accuracy of global and regional scale meteorological and oceanographic forecast models. Wherever applicable, and based on favorable Science & Technology (S&T) assessments, tasks shall leverage or transition existing Small Business Innovative Research and/or RDT&E Budget Activity (BA) 2 and 3 S&T work. Metric -- Tasks will address no less than 75% of applicable capability gaps and requirements.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications					Project (Number/Name) 2341 / METOC Data Acquisition						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC (DATA) Collections	WR	NRL : Washington, DC	77.695	3.237	Nov 2016	0.432	Nov 2017	0.431	Nov 2018	-		0.431	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	WR	SSC PAC : California	23.063	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	Various	Various : Various	45.516	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare (TOC USW)	Various	Various : Various	5.764	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Littoral Battlespace Sensing - Autonomous Undersea Vehicle	Various	Various : Various	8.422	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare (TOC USW)	WR	NSWC : Bethesda, MD	0.988	0.205	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	C/FP	APPLIED SCIENCE ASSOCIATED : RHODE ISLAND	0.000	0.226	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC (DATA) Collections	C/FP	University of Washington : Seattle, WA	0.000	0.000		0.050	Nov 2017	0.470	Nov 2018	-		0.470	Continuing	Continuing	Continuing
METOC (DATA) Collections	C/FP	METRON : Reston, VA	0.000	0.000		0.314	Nov 2017	0.110	Dec 2018	-		0.110	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	C/FP	SAIC : Virginia	1.481	0.300	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC (DATA) Collections	C/FP	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.328	0.328	-
METOC Future Mission Capabilities	C/FP	CSC : Virginia	0.431	0.300	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC (DATA) Collections	WR	NRL : Monterey, CA Stennis Space Center, MS	0.000	0.000		1.896	Nov 2017	0.915	Dec 2018	-		0.915	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2341 / METOC Data Acquisition							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	C/CPFF	GDIT : Virginia	0.138	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC (DATA) Collections	C/FP	Penn State University : PA	0.000	0.000		2.791	Nov 2017	1.545	Dec 2018	-		1.545	Continuing	Continuing	Continuing
Subtotal			163.498	4.268		5.483		3.471		-		3.471	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	C/CPIF	Various : Various	2.672	0.000		0.000		0.000		-		0.000	0.000	2.672	-
Littoral Battlespace Sensing - Autonomous Undersea Vehicle	C/FP	SAIC : Virginia	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	-
Tactical Oceanography Capabilities / Undersea Warfare (TOC USW)	WR	SSC PAC : California	0.247	0.000		0.000		0.000		-		0.000	0.000	0.247	-
METOC Future Mission Capabilities	C/CPFF	PSS/BAH : California	0.066	0.000		0.000		0.000		-		0.000	0.000	0.066	-
Subtotal			3.585	0.000		0.000		0.000		-		0.000	0.000	3.585	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	Various	Various : Various	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
Subtotal			0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2341 / METOC Data Acquisition							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Workforce	Various	Not Specified : Not Specified	0.096	0.000		0.000		0.000		-		0.000	0.000	0.096	-
METOC Future Mission Capabilities Management Support	C/FP	BAH : Virginia	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Subtotal			0.496	0.000		0.000		0.000		-		0.000	0.000	0.496	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			167.779	4.268		5.483		3.471		-		3.471	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)													
1319 / 4				PE 0603207N / Air/Ocean Tactical Applications				2341 / METOC Data Acquisition													
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
METOC Future Mission Capabilities (FMC)																					
Geospatial Information and Services (GI&S) Delivery Technologies:																					
Assess Reach-back and On Scene Data Fusion: Schedule Detail																					
Ocean & Atmos Data Acq & Processing																					
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 4																					
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 5																					
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 6																					
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 7																					
UUV-USV At-Sea Experimentation:: Sea Test 3																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2341 / METOC Data Acquisition

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
METOC Future Mission Capabilities (FMC)				
Geospatial Information and Services (GI&S) Delivery Technologies:	1	2019	4	2019
Assess Reach-back and On Scene Data Fusion: Schedule Detail	1	2019	4	2020
Ocean & Atmos Data Acq & Processing				
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 4	4	2017	4	2017
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 5	4	2018	4	2018
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 6	4	2019	4	2019
Through-the-Sensor Data Collection:: Through-the-Sensor Data Collection: SSN Data Collection 7	4	2020	4	2020
UUV-USV At-Sea Experimentation:: Sea Test 3	4	2017	4	2017

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2342: METOC Data Assimilation and Mod	231.124	20.082	21.111	17.441	-	17.441	21.117	21.596	21.495	22.441	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Battlespace Data Assimilation and Prediction Project (2342) enables the future warfighter to leverage observed environmental data gathered under Project 2341 (METOC Collections) by assimilating data into and fusing them with sophisticated high-resolution (spatial and temporal) assessment and prediction models made possible by high-performance computing. These models gain increasing importance as weapons and sensors grow in sophistication and complexity, making them all the more sensitive to the effects of the natural environment. Meteorology and Oceanography (METOC) Processing enables full understanding of the limitations and constraints imposed by ocean and atmosphere, in space and time, thus quantifying and minimizing their impact on weapons, sensors and mission. However, METOC Processing itself is limited by the temporal and spatial resolutions at which data are collected and numerically analyzed and predicted. Thus Projects 2341 and 2342 must remain aggressive in delivering higher and higher resolutions, demanding greater and greater computational and database capacities. METOC Processing efforts must also rise to the challenge of assimilating smaller-scale phenomena, particularly in the littorals, and predicting their spatial and temporal effects, as stated by Fleet and Force Commanders who require remote autonomous, clandestine, littoral battlespace sensing in near-shore areas to enable Sea Shield & Sea Basing. This next step in the Information Warfare (IW) Tasking, Collection, Processing, Exploitation and Dissemination (TCPED) continuum, METOC Processing, is critical to fully characterize the physical battlespace environment in real-time and in predictive / forecasting modes, and gives the warfighter a decisive advantage in the complex blue-water, littoral and deep-strike battlespaces.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC)	4.408	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: FY2018 funding from project unit (PU) 2342 Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC) realigned to PE 0603207N PU 2342 METOC Data Assimilation and Mod, Battlespace Data Assimilation and Prediction.					
FY 2018 Plans: NA					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
Title: Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities	Articles: -	3.544	0.000	0.000	0.000	0.000
Description: FY2018 funding from project unit 2342 METOC Data Assimilation and Mod, Meteorological and Oceanographic (METOC) Space-Base Sensing Capabilities is realigned to PE 0603207N AIR/OCEAN TACTICAL APPLICATIONS PU 2342 METOC Data Assimilation and Mod, Battlespace Data Assimilation and Prediction.		-	-	-	-	-
FY 2018 Plans: NA						
FY 2019 Base Plans: NA						
FY 2019 OCO Plans: NA						
Title: Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)	Articles: -	2.310	0.000	0.000	0.000	0.000
Description: FY18 funding from project 2342 sub project Tactical Oceanography Capabilities (TOC)/Undersea Warfare (USW) realigned to PE 0603207N project 2342 METOC Data Assimilation and Mod, sub project Battlespace Data Assimilation and Prediction.		-	-	-	-	-
FY 2018 Plans: NA						
FY 2019 Base Plans: NA						
FY 2019 OCO Plans: NA						
Title: Battlespace Data Assimilation and Prediction	Articles: -	0.000	10.389	8.443	0.000	8.443

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Description: The Battlespace Data Assimilation and Prediction Project (2342) enables the future warfighter to leverage observed environmental data gathered under Project 2341 (METOC Collections) by assimilating data into and fusing them with sophisticated high-resolution (spatial and temporal) assessment and prediction models made possible by high-performance computing. These models gain increasing importance as weapons and sensors grow in sophistication and complexity, making them all the more sensitive to the effects of the natural environment. METOC Processing enables full understanding of the limitations and constraints imposed by ocean and atmosphere, in space and time, thus quantifying and minimizing their impact on weapons, sensors and mission. However, METOC Processing itself is limited by the temporal and spatial resolutions at which data are collected and numerically analyzed and predicted. Thus Projects 2341 and 2342 must remain aggressive in delivering higher and higher resolutions, demanding greater and greater computational and database capacities. METOC Processing efforts must also rise to the challenge of assimilating smaller-scale phenomena, particularly in the littorals, and predicting their spatial and temporal effects, as stated by Fleet and Force Commanders who require remote autonomous, clandestine, littoral battlespace sensing in near-shore areas to enable Sea Shield & Sea Basing. This next step in the TC PED continuum, METOC Processing, is critical to fully characterize the physical battlespace environment in real-time and in predictive / forecasting modes, and gives the warfighter a decisive advantage in the complex blue-water, littoral and deep-strike battlespaces.</p> <p>FY18 funding realigned to PE 0603207N (Air/Ocean Tactical Applications) project 2342 Battlespace Data Assimilation and Prediction from PE 0603207N (Air/Ocean Tactical Applications) project 2342 Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC), Meteorological and Oceanographic (METOC) Space-Base Sensing Capabilities and Tactical Oceanography Capabilities (TOC)/Undersea Warfare (USW). This is not a new start</p>						
<p>FY 2018 Plans:</p> <ul style="list-style-type: none">- Continue: Advance the use of satellite observations targeting battlespace environment characterization, supporting global and mesoscale models currently at resolutions of 5-30km horizontally; with vertical extents from the surface and boundary layer, through the models depth which reaches up to ~80km.- Continue: Advance the capability and forecast skills of the Navy's global numerical weather prediction system NAVGEM and to transition improvements and new technologies into operational NAVGEM.- Continue: Work toward transition of emerging short term (5 day) high-resolution analysis and forecast capabilities to Fleet Numerical Meteorology and Oceanography Center (FNMOC) that address small-scale (meso- and micro-scale) atmospheric, coupled (atmospheric-land-ocean-wave), tropical cyclone, and mesoscale						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
ensemble prediction using the current small-scale Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS?). - Continue: Deliver capability to rapidly relocate and exercise a high-resolution coupled air-ocean-wave environmental assimilation and prediction system. - Continue: Improve the passive acoustic model, NSPE, and uBand and provide ongoing NSPE and uBand support to operational community, with special focus on guiding implementation within the Ocean Observing Systems (OOS) Performance Prediction & Mitigation project. - Continue: Work toward transition of product algorithms to improve environmental characterization and tropical cyclone structural and intensity analysis through sensor data visualization, customized imagery, automated sensor data fusion, and automated image analysis. - Continue: Take advantage of real-time spectrum operations (RTSO)-based through-the-sensor (TTS) observations to improve the characterization of the electromagnetic environment. - Continue: Work toward transition of a high resolution global weather prediction system NAVGEM with resolution of approximately T1023L100 (13 km horizontal resolution and 100 vertical layers) that is highly competitive in predictive skill with other operational global NWP systems. - Continue: Work toward transition of a probabilistic tropical cyclone forecasting system, which represents the key uncertainties associated with initial and boundary conditions, based on a COAMPS-TC ensemble and fully integrated into the COAMPS-OS. - Continue: Work toward delivery of a global Naval ocean/ice nowcasting and forecasting capability based on the HYbrid Coordinate Ocean Model (HYCOM) two-way coupled to the Community Ice Code (CICE) and using the Navy Coupled Ocean Data Assimilation (NCODA) that runs daily at production centers. - Continue: Work toward delivery of an in-situ submarine (BQH-9) capability to produce an estimate of the seabed bottom loss (BL), and deliver data to NAVO for inclusion in the HFBL database. - Continue: Improve the accuracy of Tactical Decision Aids (TDA) acoustic performance calculations in support of surface ship operations by reconciling Fleet sonar data with the Ocean-Atmosphere Master Library (OAML) models and databases, and also starts to test candidate parameterizations for the high-frequency bottom loss (HFBL) database. - Continue: Work toward implementation of new remote sensing data assimilation and determine impacts on NAAPS (aerosol) forecast skill and deliver code to FNMOC. - Continue: Post-process the first moment of NUOPC ensemble forecasts of low-level temperature and humidity, with comparative analysis of EM/EO conditions in raw and bias-corrected grids. - Continue: Prepare the Navy Aerosol Analysis and Prediction System (NAAPS) to run using fields from NAVGEM v2.0.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue: Leverage an existing prototype of a probabilistic aerosol forecasting system that has been ported to the Navy DoD Supercomputing Resource Center (DSRC) computers and continue work towards developing it as a quasi- operational system. - Continue: Develop an improved boundary roughness reflection loss (or forward loss) model that will improve accuracy in propagation and reverberation modeling with particular focus on mid frequencies (1-3 kHz). - Begin: Reduce NAVGEM's error in the calculations of the EAAMF, which are provided to the Naval Observatory for calculation of the changes in the length of day (LOD). - Continue: Improve the hydrodynamic and wave prediction capability of the Coupled Atmosphere-Ocean Mesoscale Prediction System (COAMPS) for the coastal ocean (shelf- break to estuarine and surf zone) environment. - Continue: Improve short-term (7day) forecast skill of global and regional scale ocean and coupled numerical weather prediction by transitioning capabilities to derive, assimilate, and evaluate the impact of assimilating sea surface temperature (SST) and ancillary data from satellite retrievals. - Continue: Develop methodologies for retrieval, quality control, and gridded analysis of remotely sensed satellite observations for measurement of latent, sensible, radiation and momentum fluxes. - Continue: Provide mission planners and operators with operationally relevant ocean color data and products. - Continue: Improve short term (5-7 day) forecast skill of sea ice predictions by assimilating current and future satellite derived ice products into the Navy's operational ice forecast systems. - Continue: Migrate the OAML library, administrative, and management functions to a cloud-based approach. - Continue: Improve short-term (7 day) forecast skill of global and regional scale ocean and coupled NWP by transitioning capabilities to NAVOCEANO and other operational centers to assimilate satellite and in situ observations in a manner that realistically projects high resolution altimeter and other surface information into the sparsely sampled ocean interior. - Continue: Provide operational multi-sensor high-resolution satellite visible/near-infrared/infrared (Vis/NIR/IR) and passive microwave (PMW) sea ice concentration retrievals for improved sea ice forecasts and safe navigation in both the Arctic and Antarctic. - Continue: Leverage swell data from the Sentinel-1A satellite to generate a monthly climatology of ocean swell, useful as a first guess of the expected climate in mission-critical regions determined in consultation with Navy forecasters; also leverage output from the global wave model run in hind-cast mode to augment the ocean swell database. - Continue: Work toward transition of a 4DVar (4-Dimensional Variance) data assimilation capability with highly nonlinear ocean circulation regimes such as western boundary currents; test 4DVar with very high resolution configurations of regional domains; estimate an analysis error covariance; initialize an ensemble forecast.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>- Continue: Improve the state of the art of tropical cyclone (TC) forecast guidance and tactical applications for operational decision makers.</p> <p>FY 2019 Base Plans:</p> <ul style="list-style-type: none">- Complete: Advance the use of satellite observations targeting battlespace environment characterization, supporting global and mesoscale models currently at resolutions of 5-30km horizontally; with vertical extents from the surface and boundary layer, through the models depth which reaches up to ~80km.- Complete: Advance the capability and forecast skills of the Navy's global numerical weather prediction system NAVGEM and to transition improvements and new technologies into operational NAVGEM.- Complete: Work toward transition of emerging short term (5 day) high-resolution analysis and forecast capabilities to Fleet Numerical Meteorology and Oceanography Center (FNMOC) that address small-scale (meso- and micro-scale) atmospheric, coupled (atmospheric-land-ocean-wave), tropical cyclone, and mesoscale ensemble prediction using the current small-scale Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS?).- Complete: Deliver capability to rapidly relocate and exercise a high-resolution coupled air-ocean-wave environmental assimilation and prediction system.- Complete: Improve the passive acoustic model, NSPE, and uBand and provide ongoing NSPE and uBand support to operational community, with special focus on guiding implementation within the Ocean Observing Systems (OOS) Performance Prediction & Mitigation project.- Complete: Work toward transition of product algorithms to improve environmental characterization and tropical cyclone structural and intensity analysis through sensor data visualization, customized imagery, automated sensor data fusion, and automated image analysis.- Complete: Take advantage of real-time spectrum operations (RTSO)-based through-the-sensor (TTS) observations to improve the characterization of the electromagnetic environment.- Complete: Work toward transition of a high resolution global weather prediction system NAVGEM with resolution of approximately T1023L100 (13 km horizontal resolution and 100 vertical layers) that is highly competitive in predictive skill with other operational global NWP systems.- Complete: Work toward transition of a probabilistic tropical cyclone forecasting system, which represents the key uncertainties associated with initial and boundary conditions, based on a COAMPS-TC ensemble and fully integrated into the COAMPS-OS.- Complete: Work toward delivery of a global Naval ocean/ice nowcasting and forecasting capability based on the Hybrid Coordinate Ocean Model (HYCOM) two-way coupled to the Community Ice Code (CICE) and using the Navy Coupled Ocean Data Assimilation (NCODA) that runs daily at production centers.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Complete: Work toward delivery of an in-situ submarine (BQH-9) capability to produce an estimate of the seabed bottom loss (BL), and deliver data to NAVO for inclusion in the HFBL database. - Complete: Improve the accuracy of Tactical Decision Aids (TDA) acoustic performance calculations in support of surface ship operations by reconciling Fleet sonar data with the Ocean-Atmosphere Master Library (OAML) models and databases, and also starts to test candidate parameterizations for the high-frequency bottom loss (HFBL) database. - Complete: Work toward implementation of new remote sensing data assimilation and determine impacts on NAAPS (aerosol) forecast skill and deliver code to FNMOC. - Complete: Post-process the first moment of NUOPC ensemble forecasts of low-level temperature and humidity, with comparative analysis of EM/EO conditions in raw and bias-corrected grids. - Complete: Prepare the Navy Aerosol Analysis and Prediction System (NAAPS) to run using fields from NAVGEM v2.0. - Complete: Leverage an existing prototype of a probabilistic aerosol forecasting system that has been ported to the Navy DoD Supercomputing Resource Center (DSRC) computers and continue work towards developing it as a quasi- operational system. - Complete: Develop an improved boundary roughness reflection loss (or forward loss) model that will improve accuracy in propagation and reverberation modeling with particular focus on mid frequencies (1-3 kHz). - Continue: Reduce NAVGEM's error in the calculations of the EAAMF, which are provided to the Naval Observatory for calculation of the changes in the length of day (LOD). - Complete: Improve the hydrodynamic and wave prediction capability of the Coupled Atmosphere-Ocean Mesoscale Prediction System (COAMPS) for the coastal ocean (shelf- break to estuarine and surf zone) environment. - Complete: Improve short-term (7day) forecast skill of global and regional scale ocean and coupled numerical weather prediction by transitioning capabilities to derive, assimilate, and evaluate the impact of assimilating sea surface temperature (SST) and ancillary data from satellite retrievals. - Complete: Develop methodologies for retrieval, quality control, and gridded analysis of remotely sensed satellite observations for measurement of latent, sensible, radiation and momentum fluxes. - Complete: Provide mission planners and operators with operationally relevant ocean color data and products. - Complete: Improve short term (5-7 day) forecast skill of sea ice predictions by assimilating current and future satellite derived ice products into the Navy's operational ice forecast systems. - Complete: Migrate the OAML library, administrative, and management functions to a cloud-based approach. - Complete: Improve short-term (7 day) forecast skill of global and regional scale ocean and coupled NWP by transitioning capabilities to NAVOCEANO and other operational centers to assimilate satellite and in situ						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications		Project (Number/Name) 2342 / METOC Data Assimilation and Mod	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
observations in a manner that realistically projects high resolution altimeter and other surface information into the sparsely sampled ocean interior. - Complete: Provide operational multi-sensor high-resolution satellite visible/near-infrared/infrared (Vis/NIR/IR) and passive microwave (PMW) sea ice concentration retrievals for improved sea ice forecasts and safe navigation in both the Arctic and Antarctic. - Complete: Leverage swell data from the Sentinel-1A satellite to generate a monthly climatology of ocean swell, useful as a first guess of the expected climate in mission-critical regions determined in consultation with Navy forecasters; also leverage output from the global wave model run in hind-cast mode to augment the ocean swell database. - Complete: Work toward transition of a 4DVar (4-Dimensional Variance) data assimilation capability with highly nonlinear ocean circulation regimes such as western boundary currents; test 4DVar with very high resolution configurations of regional domains; estimate an analysis error covariance; initialize an ensemble forecast. - Complete: Improve the state of the art of tropical cyclone (TC) forecast guidance and tactical applications for operational decision makers.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: The funding decrease from FY18 to FY19 in this project is to realign resources to PROJ 3405 which will result in follow-on efforts that more fully address the needs of Fleet and Marine Corps decision makers, and to include technologies that fully integrate state-of-the-art and tactically-relevant atmospheric and ocean modeling capabilities as well as state-of-the-art information technologies such as cloud-based and high-performance computing, as well as "big data analytics" and machine learning.					
Title: Chief of Naval Operations Speed to Fleet Initiative Articles:					
Description: This Speed to Fleet effort will develop a parameterization for the Advanced Propagation Model (APM) electromagnetic energy propagation model to improve modeling of the long range radar performance. This effort will demonstrate the effectiveness of the parameterization and deliver the upgrade to the APM developers for inclusion into future releases of APM to fleet programs. This effort was previously funded in R2A Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC).					
FY 2018 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
NA						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
Title: Earth System Prediction Capability (ESPC)	Articles:	8.762	10.722	8.998	0.000	8.998
Description: The Navy Earth System Prediction Capability (ESPC) program will provide a more accurate, longer range, global ocean and atmospheric forecast system for decision support to DoD Maritime Operations through the development of an integrated, coupled atmosphere, ocean, sea ice, land and near-space prediction system with improved deterministic and probabilistic skill over the current operational modeling suite. It will result in increased accuracy for lead times of 1-30 days as well as a new capability for accurate forecasts in the Arctic at all lead times. Additionally it will seek to develop more computationally efficient environmental prediction for emerging architectures and provide Navy R&D support to the National ESPC.		-	-	-	-	-
FY 2018 Plans: Continue all efforts from FY2017, less those noted as complete.						
<ul style="list-style-type: none"> - Characterize forecast dropouts, based on 500mb Anomaly Correlation (AC) methods, in the Navy Global Environmental Model (NAVGEN), including forecast statistics, common properties and causes. - Continue: Develop and implement a fully coupled global atmosphere/wave/ocean/land/ice prediction system providing daily high-resolution deterministic 16-day and lower-resolution ensemble predictions at longer lead times. - Continue: Optimize scripting for the deterministic and ensemble systems to better manage cycling tasks for model components and data assimilation, resulting in increased modularity, better parallelism, easier debugging through error trapping, and greater reuse. - Continue: Develop an ensemble prediction system for a fully coupled global atmosphere / wave / ocean / land / sea ice coupled model for predictions out to 90 days. - Continue: Develop a fully-coupled data assimilation capability to optimize the use of the observations across fluid interfaces, eliminating the transient inconsistencies, increasing forecast skill and representing coupled uncertainties. 						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none"> - Continue: Evaluate and demonstrate the capabilities of a new generation of atmospheric dynamical systems that allow for variable resolution on the sphere, are highly scalable, and eliminate or mitigate spurious problems near the poles of the globe. - Continue: Further develop, validate, and evaluate the capability of a fully coupled regional Arctic prediction system. - Continue: Develop, integrate, and test improvements to the computational performance of models within the Navy global coupled forecast system as well as the coupling infrastructure to ensure that operational partners will meet their production schedules using available computational resources. - Continue: Improve capabilities for supporting long range Navy planning (lead times of one week and longer). - Continue: Develop and transition for operational implementation a high resolution global weather prediction system NAVGEM with resolution of approximately T1023L100 (13 km horizontal resolution and 100 vertical layers) that is highly competitive in predictive skill with other operational global NWP systems. - Continue: Define, develop and implement consistent quantitative skill metrics to assess the advancements in the Earth System Prediction Capability (ESPC), taking into account the applications and lead-times for which the ESPC environmental information will be used. - Continue: Evaluate and validate multi-model extended-range forecasts produced from interagency projects such as the North American Multi-model Ensemble (NMME). - Continue: Develop the NAVGEM global model to include inline aerosols to simulate aerosol life cycle and perform aerosol direct radiative heating of the atmosphere. - Continue: Participate in the North American Multi-Model Ensemble (NMME) by re-forecasting the global coupled (NAVGEN-HYCOM-CICE) Navy ESPC model for years 1999 to 2015. - Continue: Accelerate the rate of improvement in the US National Earth System Prediction Capability (ESPC) and National Unified Operational Prediction Capability (NUOPC), focusing primarily on the current and future generation global modeling enterprise. - Continue: Develop the NAVGEM global model to address middle atmosphere processes associated with sudden stratospheric warming and extended range prediction. 				
<p>FY 2019 Base Plans: Continue all efforts from FY2018, less those noted as complete.</p> <ul style="list-style-type: none"> - Continue: Characterize forecast dropouts, based on 500mb Anomaly Correlation (AC) methods, in the Navy Global Environmental Model (NAVGEN), including forecast statistics, common properties and causes. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue: Develop and implement a fully coupled global atmosphere/wave/ocean/land/ice prediction system providing daily high-resolution deterministic 16-day and lower-resolution ensemble predictions at longer lead times. - Continue: Optimize scripting for the deterministic and ensemble systems to better manage cycling tasks for model components and data assimilation, resulting in increased modularity, better parallelism, easier debugging through error trapping, and greater reuse. - Continue: Develop an ensemble prediction system for a fully coupled global atmosphere / wave / ocean / land / sea ice coupled model for predictions out to 90 days. - Continue: Develop a fully- coupled data assimilation capability to optimize the use of the observations across fluid interfaces, eliminating the transient inconsistencies, increasing forecast skill and representing coupled uncertainties. - Continue: Evaluate and demonstrate the capabilities of a new generation of atmospheric dynamical systems that allow for variable resolution on the sphere, are highly scalable, and eliminate or mitigate spurious problems near the poles of the globe. - Continue: Further develop, validate, and evaluate the capability of a fully coupled regional Arctic prediction system. - Continue: Develop, integrate, and test improvements to the computational performance of models within the Navy global coupled forecast system as well as the coupling infrastructure to ensure that operational partners will meet their production schedules using available computational resources. - Continue: Improve capabilities for supporting long range Navy planning (lead times of one week and longer). - Continue: Develop and transition for operational implementation a high resolution global weather prediction system NAVGEM with resolution of approximately T1023L100 (13 km horizontal resolution and 100 vertical layers) that is highly competitive in predictive skill with other operational global NWP systems. - Continue: Define, develop and implement consistent quantitative skill metrics to assess the advancements in the Earth System Prediction Capability (ESPC), taking into account the applications and lead-times for which the ESPC environmental information will be used. - Continue: Evaluate and validate multi-model extended-range forecasts produced from interagency projects such as the North American Multi-model Ensemble (NMME). - Continue: Develop the NAVGEM global model to include inline aerosols to simulate aerosol life cycle and perform aerosol direct radiative heating of the atmosphere. - Continue: Participate in the North American Multi-Model Ensemble (NMME) by re-forecasting the global coupled (NAVGEN-HYCOM-CICE) Navy ESPC model for years 1999 to 2015.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018									
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications					Project (Number/Name) 2342 / METOC Data Assimilation and Mod										
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
<ul style="list-style-type: none"> - Continue: Accelerate the rate of improvement in the US National Earth System Prediction Capability (ESPC) and National Unified Operational Prediction Capability (NUOPC), focusing primarily on the current and future generation global modeling enterprise. - Continue: Develop the NAVGEM global model to address middle atmosphere processes associated with sudden stratospheric warming and extended range prediction. 																			
FY 2019 OCO Plans: N/A																			
FY 2018 to FY 2019 Increase/Decrease Statement: The funding decrease from FY18 to FY19 in this project is to realign resources to PROJ 3405 which will result in follow-on efforts that more fully address the needs of Fleet and Marine Corps decision makers, and to include technologies that fully integrate state-of-the-art and tactically-relevant atmospheric and ocean modeling capabilities as well as state-of-the-art information technologies such as cloud-based and high-performance computing, as well as "big data analytics" and machine learning.																			
Accomplishments/Planned Programs Subtotals										20.082	21.111	17.441	0.000	17.441					
C. Other Program Funding Summary (\$ in Millions)																			
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2019							Cost To						
• RDTEN/0604218N/2345: <i>FLEET METOC EQUIPMENT</i>	0.354	0.491	0.480	-	0.480	0.458							Complete	Total Cost					
													Continuing	Continuing					
Remarks																			
D. Acquisition Strategy Acquisition, management and contracting strategies are to support the Meteorological and Oceanographic (METOC) Data Assimilation and Modeling Project to develop, demonstrate, and validate METOC data assimilation and environmental prediction capabilities, enabling timely and accurate delivery of METOC prediction data and products to the Tactical Commander, all with management oversight by the Navy.																			
E. Performance Metrics Goal: Develop techniques and tools to assimilate Meteorological and Oceanographic (METOC) data in order to improve the accuracy of global and regional scale meteorological and oceanographic forecast models. Data assimilation is expanded to include new in-situ and remotely-sensed data types, based on operational need. Tasks are directed toward advanced software enabling assimilation of disparate sources on non-synoptic time scales. Acoustic, atmospheric, and oceanographic model development, prototyping and transition is focused on improved model physics, increased resolution, and computational efficiency.																			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod
Metric: Tasks will address no less than 75% of applicable capability gaps and requirements.		
Goal (ESPC): Develop a more accurate global ocean, atmosphere, wave and sea ice forecast system with longer skillful forecast times from weeks to seasons through integrating and coupling atmosphere, ocean, ice, land and near-space forecast models into a seamless deterministic and ensemble prediction system that significantly improves skill over the current modeling suite. Additionally develop a common modeling architecture to improve cross- Agency collaboration, and greatly more efficient environmental modeling and computational architectures to allow for real-time operational prediction at comparable skill level to international competitors.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2342 / METOC Data Assimilation and Mod							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	WR	NRL : Washington DC	124.331	3.626	Nov 2016	0.845	Nov 2017	0.852	Nov 2018	-		0.852	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	Various	Various : Various	46.068	0.000		0.000		0.000		-		0.000	0.000	46.068	-
METOC Space-Based Sensing Capabilities	WR	NRL : Washington, DC	14.547	2.545	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	WR	NRL : Washington, DC	8.340	1.140	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	University of Texas : TX	1.163	0.000		0.100	Nov 2017	0.000		-		0.000	0.000	1.263	-
Tactical Oceanography Capabilities / Undersea Warfare	WR	NSWC Carderock : West Bethesda, MD	1.640	0.450	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	WR	NAVOCEANO : Mississippi	0.549	0.000		0.000		0.000		-		0.000	0.000	0.549	-
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	University of Washington : Seattle, WA	0.730	0.120	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	Johns Hopkins University : MD	0.340	0.091	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	SAIC/QNA : Various	1.605	0.271	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	C/FP	SAIC/QNA : Various	2.482	0.614	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	Penn State University : Pennsylvania	0.125	0.000		0.000		0.000		-		0.000	0.000	0.125	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2342 / METOC Data Assimilation and Mod							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Tactical Oceanography Capabilities / Undersea Warfare	WR	SSC LANT : North Charleston	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	-
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	SPA : Virginia	0.375	0.000		0.000		0.000		-		0.000	0.000	0.375	-
METOC SUPPORT SPACE-SOFTWARE DEVELOPMENT	WR	NRL : WASHINGTON DC	0.000	0.515	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	METRON : Virginia	0.385	0.000		0.000		0.000		-		0.000	0.000	0.385	-
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	Vencore : Virginia	0.239	0.000		0.000		0.000		-		0.000	0.000	0.239	-
METOC Battlespace Data Assimilation and Prediction	WR	NRL : Monterey, CAI Stennis Space Center, MS	0.000	0.000		8.924	Nov 2017	7.194	Dec 2018	-		7.194	0.000	16.118	-
Earth Systems Prediction Capability (ONR)	WR	NRL : Washington DC	15.883	7.431	Nov 2016	8.847	Nov 2017	6.611	Dec 2018	-		6.611	Continuing	Continuing	Continuing
ESPC	Various	Various : Various	6.006	1.661	Nov 2016	0.681	Nov 2017	0.981	Dec 2018	-		0.981	Continuing	Continuing	Continuing
CHIEF OF NAVAL OPERATIONS SPEED TO FLEET INITIATIVE	WR	NRL : WASHINGTON DC	0.000	0.850	Nov 2016	0.000		0.000		-		0.000	1.130	1.980	-
Subtotal		224.858	19.314		19.397		15.638		-		15.638	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	Various	Various : Various	0.795	0.000		0.000		0.000		-		0.000	0.000	0.795	-

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Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2342 / METOC Data Assimilation and Mod							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Littoral Battlespace Sensing - Autonomous Undersea Vehicle	C/FP	SAIC : Virginia	0.473	0.000		0.000		0.000		-		0.000	0.000	0.473	-
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	SAIC : Virginia	0.634	0.000		0.000		0.000		-		0.000	0.000	0.634	-
METOC Future Mission Capabilities	C/FP	SAIC : VIRGINIA	0.000	0.115	Nov 2016	0.100	Nov 2017	0.100	Dec 2018	-		0.100	Continuing	Continuing	Continuing
METOC SUPPORT SPACE-PROGRAM SUPPORT	WR	SSC PACIFIC : SAN DIEGO, CA	0.000	0.090	Nov 2016	0.100	Nov 2017	0.100	Dec 2018	-		0.100	Continuing	Continuing	Continuing
Earth System Modeling Framework - Common Software Architecture	Various	Various : Boulder, CO; Various	0.000	0.000		0.660	Nov 2017	0.660	Nov 2018	-		0.660	0.000	1.320	-
Program Support and Subject Matter Expertise	Various	UW-APL : Seattle, WA	1.563	0.000		0.358	Nov 2017	0.358	Dec 2018	-		0.358	Continuing	Continuing	Continuing
Subtotal			3.465	0.205		1.218		1.218		-		1.218	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Data Analytics and Machine Learning	TBD	Charles River : Boston, MA	0.000	0.000		0.234	Nov 2017	0.323	Dec 2018	-		0.323	0.000	0.557	-
Subtotal			0.000	0.000		0.234		0.323		-		0.323	0.000	0.557	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Workforce	Various	Various : Various	0.090	0.000		0.000		0.000		-		0.000	0.000	0.090	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2342 / METOC Data Assimilation and Mod								
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
METOC Space-Based Sensing Capabilities	Various	Various : Various	1.350	0.000		0.000		0.000		-		0.000	0.000	1.350	-	
Tactical Oceanography Capabilities / Undersea Warfare	WR	SSC PAC : San Diego, CA	1.145	0.171	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
METOC Future Mission Capabilities	C/FP	PSS/BAH : San Diego, CA	0.216	0.000		0.000		0.000		-		0.000	0.000	0.216	-	
METOC Space-Based Sensing Capabilities	C/FP	BAH : VIRGINIA	0.000	0.142	Nov 2016	0.100	Nov 2017	0.100	Nov 2018	-		0.100	Continuing	Continuing	Continuing	
METOC Space-Based Sensing Capabilities	WR	SSC PAC : SAN DIEGO, CA	0.000	0.213	Nov 2016	0.100	Nov 2017	0.100	Nov 2018	-		0.100	Continuing	Continuing	Continuing	
METOC Acquisition Management	C/CPFF	PSS/BAH : SAN DIEGO, CA	0.000	0.037	Nov 2016	0.062	Nov 2017	0.062	Nov 2018	-		0.062	Continuing	Continuing	Continuing	
			Subtotal	2.801	0.563		0.262		0.262		-		0.262	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
			Project Cost Totals	231.124	20.082		21.111		17.441		-		17.441	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

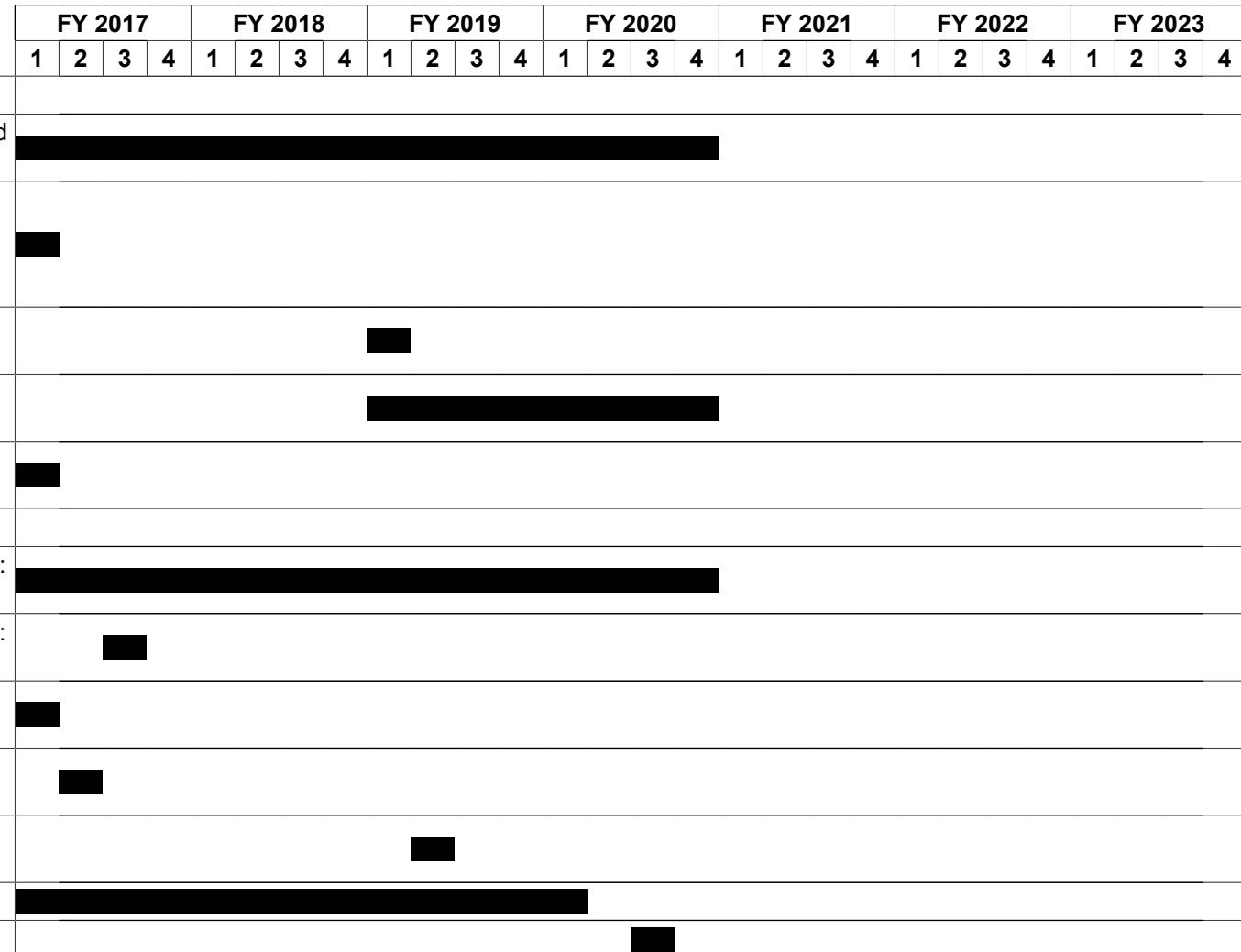
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603207N / Air/Ocean Tactical
Applications**Project (Number/Name)**

2342 / METOC Data Assimilation and Mod



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603207N / Air/Ocean Tactical
Applications**Project (Number/Name)**

2342 / METOC Data Assimilation and Mod

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
EarthCare: Dev. EarthCARE Data Algorithms: EarthCARE Launch																															
EarthCare: Dev. EarthCARE Data Algorithms: Schedule Detail																															
Cosmic: DEV Cosmic Data Algorithms: Schedule Detail																															
Cosmic: DEV Cosmic Data Algorithms: Cosmic-2 Launch																															
METEOSAT: DEV METEOSAT Data Algorithms: MTG-I1 Launch																															
METEOSAT: DEV METEOSAT Data Algorithms: FY16-FY20																															
METOP: DEV METOP Data Algorithms: FY16-FY20																															
METOP: DEV METOP Data Algorithms: METOP-C Launch																															
Jason: Dev Jason Algorithm: FY16-FY20																															
Jason: Dev Jason Algorithm: JASON-CS A Launch																															
GEO-KOMPSA: DEV GEO-KOMPSAT Data Algorithms: GEO-KOMPSAT 2A Launch																															
GEO-KOMPSA: DEV GEO-KOMPSAT Data Algorithms: GEO-KOMPSAT 2B Launch																															
GEO-KOMPSA: DEV GEO-KOMPSAT Data Algorithms: Schedule Detail																															
DMSP: DEV DMSP Data Algorithms: FY16- FY20																															
DMSP: DEV DMSP Data Algorithms: DMSP-20 Launch																															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603207N / Air/Ocean Tactical
Applications**Project (Number/Name)**

2342 / METOC Data Assimilation and Mod

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
INSAT: DEV INST Data Algorithms: Schedule Detail	[REDACTED]																														
OceanSat: Dev. OceanSat Data Algorithms: OceanSat 3 Launch		[REDACTED]																													
Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)																															
ASW RBC Delivery: ASW RBC Delivery 2		[REDACTED]																													
ASW RBC Delivery: ASW RBC Delivery 3			[REDACTED]																												
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 3			[REDACTED]																												
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 4				[REDACTED]																											
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 5					[REDACTED]																										
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 6						[REDACTED]																									
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS Toolset: NEXGEN ASW RBC GIS TOOLSET 1		[REDACTED]																													
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS Toolset: NEXGEN ASW RBC GIS TOOLSET 2			[REDACTED]																												
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS				[REDACTED]																											

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)								
1319 / 4								PE 0603207N / Air/Ocean Tactical Applications								2342 / METOC Data Assimilation and Mod								
								FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023				
								1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Toolset: NEXGEN ASW RBC GIS TOOLSET 3																								
STAPLE Upgrades: STAPLE Delivery 11																								
STAPLE Upgrades: Documentation Delivery																								
STAPLE Upgrades: EPMA-NSMA Integration 2																								
STAPLE Upgrades: EPMA-NSMA Integration 3																								
Active & Passive Model-Data V&V: Active ASW R&A 4																								
Active & Passive Model-Data V&V: Active ASW R&A 5																								
Active & Passive Model-Data V&V: Active ASW R&A 6																								
Active & Passive Model-Data V&V: Active ASW R&A 7																								
Boundary Interaction Algorithms: TOTLOSS/ SCATTER Algorithm Delivery 3																								
Through-the-Sensor Data Collection: SSN Data Collection 4																								
Through-the-Sensor Data Collection: SSN Data Collection 5																								
Through-the-Sensor Data Collection: SSN Data Collection 6																								
Through-the-Sensor Data Collection: SSN Data Collection 7																								
UUV-USV At-Sea Experimentation: Sea Test 3																								

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018							
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)							
1319 / 4								PE 0603207N / Air/Ocean Tactical Applications								2342 / METOC Data Assimilation and Mod							
								FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023			
								1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Metoc Data Assimilation and Mod Future Mission Capabilities (ESPC)																							
ESPC Coupled Data Assimilation into Environmental Prediction:																							
ESPC Development Global Coupled Environmental Models:																							
ESPC Advanced Computational Architectures: Schedule Detail																							
ESPC Demonstrate Extended Range Prediction: Schedule Detail																							
Global Coupled Prediction System Development: Schedule Detail																							
Operation Implementation and Validation: Schedule Detail																							
Coupled Global Ensemble Prediction System: Schedule Detail																							
Next Generation Dynamic Cores: Schedule Detail																							
Computational Efficiency of Earth System: Schedule Detail																							
Advanced Observational Data Analysis and long Range Forecasting (ACAF): Schedule Detail																							
Regional Arctic Prediction System: Schedule Detail																							
National ESPC Interagency Coordinated Development: Schedule Detail																							
Global Coupled Data Assimilation: Schedule Detail																							

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603207N / Air/Ocean Tactical Applications					2342 / METOC Data Assimilation and Mod											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Navy METOC Support (SPACE)																					
Navy METOC Support (SPACE): Schedule Detail: Schedule Detail																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
METOC Future Mission Capabilities (FMC)				
METOC FMC: Data Assimilation Into Coupled Prediction Systems:	1	2017	4	2020
METOC FMC: Develop Oceanographic and Atmospheric Forecast Models: Develop Oceanographic and Atmospheric Forecast Models	1	2017	1	2017
METOC FMC: Develop Oceanographic and Atmospheric Forecast Models:	1	2019	1	2019
METOC FMC: Decision Support & Performance Prediction Tools:	1	2019	4	2020
METOC FMC: Accelerate Development of Ocean Forecast Systems:	1	2017	1	2017
METOC Space-Based Sensing Capabilities				
NPP/JPSS: Dev. NPP/JPSS Data Algorithms: FY16-FY20	1	2017	4	2020
NPP/JPSS: Dev. NPP/JPSS Data Algorithms: JPSS-1 Launch	3	2017	3	2017
GOES: Dev. GOES Algorithms: GOES-R Launch	1	2017	1	2017
GOES: Dev. GOES Algorithms: GOES-S Launch	2	2017	2	2017
GOES: Dev. GOES Algorithms: GOES-T Launch	2	2019	2	2019
GCOM: Dev. GCOM: FY16-FY20	1	2017	1	2020
GCOM: Dev. GCOM: GCOM-W3 Launch	3	2020	3	2020
EarthCare: Dev. EarthCARE Data Algorithms: EarthCARE Launch	3	2017	3	2017
EarthCare: Dev. EarthCARE Data Algorithms: Schedule Detail	1	2017	4	2020
Cosmic: DEV Cosmic Data Algorithms: Schedule Detail	1	2017	4	2020
Cosmic: DEV Cosmic Data Algorithms: Cosmic-2 Launch	3	2018	3	2018
METEOSAT: DEV METEOSAT Data Algorithms: MTG-I1 Launch	3	2020	3	2020
METEOSAT: DEV METEOSAT Data Algorithms: FY16-FY20	1	2017	4	2020
METOP: DEV METOP Data Algorithms: FY16-FY20	1	2017	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod		
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
METOP: DEV METOP Data Algorithms: METOP-C Launch		3	2018	3
Jason: Dev Jason Algorithm: FY16-FY20		1	2017	4
Jason: Dev Jason Algorithm: JASON-CS A Launch		1	2018	1
GEO-KOMPSA: DEV GEO-KOMPSAT Data Algorithms: GEO-KOMPSAT 2A Launch		1	2018	1
GEO-KOMPSA: DEV GEO-KOMPSAT Data Algorithms: GEO-KOMPSAT 2B Launch		4	2018	4
GEO-KOMPSA: DEV GEO-KOMPSAT Data Algorithms: Schedule Detail		1	2017	4
DMSP: DEV DMSP Data Algorithms: FY16-FY20		1	2017	4
DMSP: DEV DMSP Data Algorithms: DMSP-20 Launch		1	2020	1
INSAT: DEV INST Data Algorithms: Schedule Detail		1	2017	1
OceanSat: Dev. OceanSat Data Algorithms: OceanSat 3 Launch		3	2017	3
Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)				
ASW RBC Delivery: ASW RBC Delivery 2		4	2017	4
ASW RBC Delivery: ASW RBC Delivery 3		4	2018	4
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 3		4	2017	4
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 4		4	2018	4
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 5		4	2019	4
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 6		4	2020	4
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS Toolset: NEXGEN ASW RBC GIS TOOLSET 1		2	2017	2
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS Toolset: NEXGEN ASW RBC GIS TOOLSET 2		4	2018	4
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS Toolset: NEXGEN ASW RBC GIS TOOLSET 3		4	2020	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications		Project (Number/Name) 2342 / METOC Data Assimilation and Mod	
Events by Sub Project	Start	End		
Quarter	Year	Quarter	Year	
STAPLE Upgrades: STAPLE Delivery 11	4	2017	4	2017
STAPLE Upgrades: Documentation Delivery	4	2017	4	2017
STAPLE Upgrades: EPMA-NSMA Integration 2	4	2018	4	2018
STAPLE Upgrades: EPMA-NSMA Integration 3	4	2019	4	2019
Active & Passive Model-Data V&V: Active ASW R&A 4	4	2017	4	2017
Active & Passive Model-Data V&V: Active ASW R&A 5	4	2018	4	2018
Active & Passive Model-Data V&V: Active ASW R&A 6	4	2019	4	2019
Active & Passive Model-Data V&V: Active ASW R&A 7	4	2020	4	2020
Boundary Interaction Algorithms: TOTLOSS/SCATTER Algorithm Delivery 3	4	2018	4	2018
Through-the-Sensor Data Collection: SSN Data Collection 4	4	2017	4	2017
Through-the-Sensor Data Collection: SSN Data Collection 5	4	2018	4	2018
Through-the-Sensor Data Collection: SSN Data Collection 6	4	2019	4	2019
Through-the-Sensor Data Collection: SSN Data Collection 7	4	2020	4	2020
UUV-USV At-Sea Experimentation: Sea Test 3	4	2017	4	2017
Metoc Data Assimilation and Mod Future Mission Capabilities (ESPC)				
ESPC Coupled Data Assimilation into Environmental Prediction:	1	2017	4	2018
ESPC Development Global Coupled Environmental Models:	1	2017	4	2018
ESPC Advanced Computational Architectures: Schedule Detail	1	2017	1	2018
ESPC Demonstrate Extended Range Prediction: Schedule Detail	1	2017	1	2018
Global Coupled Prediction System Development: Schedule Detail	2	2017	3	2018
Operation Implementation and Validation: Schedule Detail	2	2017	4	2019
Coupled Global Ensemble Prediction System: Schedule Detail	2	2017	3	2020
Next Generation Dynamic Cores: Schedule Detail	3	2017	2	2020
Computational Efficiency of Earth System: Schedule Detail	3	2017	2	2020
Advanced Observational Data Analysis and long Range Forecasting (ACAF): Schedule Detail	4	2017	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2342 / METOC Data Assimilation and Mod			
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
Regional Artic Prediction System: Schedule Detail		1	2017	2	2020
National ESPC Interagency Coordinated Development: Schedule Detail		1	2017	4	2020
Global Coupled Data Assimilation: Schedule Detail		1	2017	4	2020
Navy METOC Support (SPACE)					
Navy METOC Support (SPACE): Schedule Detail: Schedule Detail		1	2017	1	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603207N / Air/Ocean Tactical Applications				2343 / <i>Tactical METOC Applications</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2343: <i>Tactical METOC Applications</i>	153.449	10.275	11.715	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	175.439
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Total funding control for Fleet Meteorology & Oceanography (METOC) Equipment (2343) in FY19 and beyond was moved from Program Element (PE) 0603207N into PE 0604218N Air Ocean Equipment Engineering Projects as a result of a Budget Activity (BA) reclassification.

A. Mission Description and Budget Item Justification

The Tactical Meteorology and Oceanography (METOC) Applications Project provides cyber secure operational effects decision aid capabilities for Navy and Marine Corps warfighters in the context of Joint Operations in a net-centric environment. This project funds the agile software development of the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program of record. NITES-Next program identifies and transitions state-of-the-art decision support software technologies from the government and commercial industry's technology base, and then demonstrates and validates these capabilities before fielding. These software decision support tools provide platform, sensor, communications, and weapon systems performance assessments for warfighters in terms of their littoral and deep-strike battlespace environments. These assessments allow mission planners and warfighters, from Unit to Theater level, to optimize their sensor employment on airborne, surface, and subsurface platforms in support of Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), Expeditionary Warfare (EXW), Electronic Warfare (EW), Information Operations (IO), Intelligence Operations (INT), Non-Combat Operations (NCO), Command, Control, Communication (CCC), and Naval Special Warfare (NSW). Performance assessments leading to improvements in operational and tactical control are conducted through a two-tiered approach: 1) Meteorological and Oceanographic (METOC) Decision Aids and, 2) Operational Effects Decision Aids (OEDAs). METOC Decision Aides consist of a series of analysis tools which characterize the physical environment conditions of the battlespace based on the best set of physical environment data available at the time (i.e., some combination of historical and/or real-time (or near real-time) in-situ, and numerically modeled forecast data). OEDAs use the METOC Decision Aide information by fusing it with relevant, often-classified, sensor and target data to predict how weapons and sensor systems will perform. Performance results are displayed in tabular and graphic formats integrated into net-centric visualization tools for use by mission planners, and combat/weapon system operators to develop localization plans, USW/AAW/ASUW screens, STW profiles, and AMW ingress and egress points. METOC Decision Aides and OEDAs typically use data derived from sensors developed in Project 2341 (METOC Data Acquisition) and assimilated by software produced by Project 2342 (METOC Data Assimilation and Modeling). METOC Decision Aides and OEDAs also use data obtained through direct interfaces to Navy combat systems. Cyber secure capabilities are a current emphasis required to characterize and/or predict sensor and weapons system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses multi-warfare areas, particularly shallow water ASW, NSW, and missile and air defense/strike capabilities.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2343 / <i>Tactical METOC Applications</i>				
Funding supports development and integration efforts for Meteorological and Oceanographic (METOC) systems to generate and collect METOC data and fuse multiple intelligence inputs to more robustly characterize and predict tactical atmospheric and oceanographic conditions. This integrated METOC picture will support real-time battlespace awareness of propagation conditions affecting signals across the electromagnetic spectrum. METOC data will be fused with other intelligence data and automatically provided to shipboard combat systems to inform kinetic and non-kinetic fires.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
Title: Naval Integrated Tactical Environmental System Next Generation (NITES-Next)	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Naval Integrated Tactical Environmental System Next Generation (NITES-Next) will continue working on the Fleet Capability Release (FCR)-2 (v2.0.2) Task Order in support of deployment in FY19/20, and also award the FCR-3 Task Order. The program will conduct a FCR-3 Build Technical Review (BTR) and seek to obtain a FCR-3 Building Decision (BD) from the Milestone Decision Authority (MDA). NITES-Next will begin initial software development of FCR 3 mobile variant, which integrates new mobile variant requirements with the previous afloat versions of FCR 2.x. The FCR-3 mobile variant software will also include anti-tamper proofing and will be releasable to our allies to enhance our interoperability with their information warfare systems. The new mobile variant will replace the current NITES-NEXT Naval Integrated Tactical Environmental System Fielded (NITES-Fielded) suite of systems that have been determined to have cyber vulnerabilities and need to be retired as soon as possible. Additionally, FCR-3 will accelerate/include the development of an Electromagnetic (EM) Prediction capability to be delivered in FY19/20. NITES-Next will plan for, and conduct, System Integration Testing (SIT), System Qualification Testing(SQT), User Assessment (UA), and Developmental Test and Evaluation (DT&E) for FCR-2 (v2.0.2) and FCR-3. NITES-Next will begin deployment of FCR-2 (v2.0.1) software. The program will obtain an Authority to Operate (ATO) for Fleet Capability Release (FCR)-2.x and FCR-3 software. The program will continue planning for the FCR-4 development and contracting activities (including updating of all required documentation, Requirements Development Package (RDP), Cost Analysis Requirements Document (CARD), Program Life Cycle Cost Estimate (PLCCE)). NITES-Next will continue using Amazon Web Services (AWS) cloud computing infrastructure to support Fleet operator training.		10.275	11.715	0.000	0.000	0.000
FY 2019 Base Plans: N/A		-	-	-	-	-
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2343 / <i>Tactical METOC Applications</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
Total funding control for Fleet Meteorology & Oceanography (METOC) Equipment (2343) in FY19 and beyond was moved from Program Element (PE) 0603207N into PE 0604218N as a result of a Budget Activity (BA) reclassification.				
Accomplishments/Planned Programs Subtotals		10.275	11.715	0.000
		0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy The NITES-Next program acquisition, management and contracting strategies are to support the Tactical Meteorology & Oceanography (METOC) Applications project to continue the development of state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessment capabilities for open ocean and littoral operating environments. The Department of the Navy (DoN) maintains management oversight of the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program's acquisition and contracting strategies. The Department of the Navy (DoN) requirements for the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program's acquisition and contracting strategies are based on approved Joint Capabilities Integration and Development System (JCIDS) documentation.				
E. Performance Metrics Goal: Field software decision aid capabilities for Navy and Marine Corps war fighters in order to facilitate the characterization and prediction of the physical environment in the battlespace. Metric: Meet the performance metrics identified in approved NITES-Next Program's requirements documents (e.g., Concept Definition Document (CDD) and individual Requirements Definition Packages (RDPs)).				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2343 / Tactical METOC Applications								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Product Development Prior Year	Various	Various : Various	117.115	0.000		0.000		0.000		-		0.000	0.000	117.115	-	
NITES-Next	WR	SSC Pacific : San Diego, CA	19.734	4.212	Oct 2016	3.758	Dec 2017	0.000		-		0.000	0.000	27.704	-	
NITES-Next	C/FP	SAIC : Virginia	7.444	2.472	Feb 2017	2.051	Dec 2017	0.000		-		0.000	0.000	11.967	-	
NITES-Next	WR	SSC Atlantic : South Carolina	0.271	0.105	Apr 2017	0.087	Oct 2017	0.000		-		0.000	0.000	0.463	-	
NITES-Next / Engineering	C/IDIQ	NAVSUP : Pennsylvania	0.000	1.300	May 2017	0.000		0.000		-		0.000	0.000	1.300	-	
NITES-Next / Engineering	C/IDIQ	SSC Pacific : Various	0.000	0.225	Jul 2017	3.791	May 2018	0.000		-		0.000	0.000	4.016	-	
Subtotal				144.564	8.314		9.687		0.000		-		0.000	0.000	162.565	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Support Prior Year	Various	Various : Various	0.720	0.000		0.000		0.000		-		0.000	0.000	0.720	-	
NITES-Next	C/FP	SAIC : Virginia	5.224	1.191	Feb 2017	1.232	Dec 2017	0.000		-		0.000	0.000	7.647	-	
Subtotal				5.944	1.191		1.232		0.000		-		0.000	0.000	8.367	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management Services Prior Year	Various	Various : Various	0.031	0.000		0.000		0.000		-		0.000	0.000	0.031	-	
NITES-Next	WR	SSC Pacific : San Diego, CA	1.140	0.293	Oct 2016	0.303	Dec 2017	0.000		-		0.000	0.000	1.736	-	
NITES-Next	C/FP	BAH : San Diego, CA	1.770	0.477	Dec 2016	0.493	Dec 2017	0.000		-		0.000	0.000	2.740	-	
Subtotal				2.941	0.770		0.796		0.000		-		0.000	0.000	4.507	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018	
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2343 / Tactical METOC Applications			
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	153.449	10.275		11.715	0.000	-	0.000	0.000	175.439	N/A
Remarks										

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Acronyms: OTRR = Operational Test Readiness Review. RDP = Requirements Definition Package. FCR = Fleet Capability Release. TRA = Technology Readiness Assessment. BD = Build Decision. FD = Fielding Decision. Limited Fielding Decision = LFD. IOC = Initial Operational Capability. IATO = Interim Authority to Operate. ATO = Authority to Operate. UA = User Assessment. BTR = Build Technical Review. Field Technical Review = FTR. SIT = System Integration Test. RALOT = Risk Assessment Level of Testing. DT&E = Developmental Test & Evaluation. ADM - Acquisition Decision Memorandum. SOVT = System Verification Operational Test. CANES = Consolidated Afloat Networks and Enterprise Services. AI = Application Integration.

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2343 / <i>Tactical METOC Applications</i>		
Schedule Details				
Events by Sub Project	Start	End	Quarter	Year
Quarter	Year	Quarter	Year	
Naval Integrated Tactical Environmental System Next Generation (NITES-Next)				
Milestones: Build Decision (BD) Fleet Capability Release - 3	2	2018	2	2018
Milestones: Fielding Decision (FD) Fleet Capability Release - 2	1	2017	1	2017
Contract Actions: FCR-2 Follow On Task Order (v2.0.0)	1	2017	4	2017
Contract Actions: FCR-2 Task Order (v2.0.1)	4	2017	2	2018
Contract Actions: FCR-2 Task Order (v2.0.2)	4	2017	4	2018
Contract Actions: FCR-3 Task Order	1	2018	4	2018
Contract Actions: FCR-3-Planning	1	2017	4	2017
Contract Actions: FCR-4 Planning	4	2017	4	2018
Engineering & Manufacturing Development Phase: Fleet Capability Release - 2 / Train Deploy	1	2017	4	2018
Engineering & Manufacturing Development Phase: Fleet Capability Release - 3 / Train Deploy	3	2017	4	2018
Engineering & Manufacturing Development Phase: Requirements Definition Package - 3	3	2017	3	2017
Engineering & Manufacturing Development Phase: Technology Readiness Assessment - 3	1	2018	1	2018
Test/IA: Fleet Capability Release - 2	3	2017	2	2018
Test/IA: Fleet Capability Release - 3	3	2018	4	2018
Test/IA: System Integration Test - 1 (FCR-2)	3	2017	3	2017
Test/IA: System Integration Test - 2 (FCR-2)	4	2017	4	2017
Test/IA: System Integration Test - 1 (FCR-3)	3	2018	3	2018
Test/IA: System Integration Test - 2 (FCR-3)	3	2018	3	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2343 / <i>Tactical METOC Applications</i>		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	1	2017	1	2017
	3	2018	3	2018
	4	2018	4	2018
	1	2018	1	2018
	4	2018	4	2018
	1	2018	1	2018
	4	2017	1	2018
	4	2018	4	2018
	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2344 / Precise Time and Astrometry				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2344: Precise Time and Astrometry	10.689	4.844	5.190	4.556	-	4.556	2.946	3.006	3.017	3.079	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Precise Timing and Astrometry (PTA) project funds research and development of improvements for the U.S. Master Clock (MC) System, the DoD Time Transfer capability, the Earth Orientation System, and the Astrometric Observation System. The MC System and Time Transfer provides precise time for use in modern military and National Technical Means (NTM) navigation, guidance, positioning, and tracking systems. The Earth Orientation System provides precise Earth Orientation Parameters for use by the DoD and the national civilian infrastructure to establish the specific orientation of the Earth and to provide input to the terrestrial reference frame. The Astrometric Observation System provides the basic data needed to generate the Celestial Reference Frame (CRF) which is the standard for calibrating all inertial navigation systems, satellite orbits, and earth rotation determinations. Improvement to the MC System, Time Transfer, Earth Orientation, and Astrometric Observation Systems are needed to ensure that new and upgraded DoD and NTM capabilities meet their performance requirements. By DoD Directive, the U.S. Naval Observatory (USNO), Washington, D.C., is responsible for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD, Federal agencies, and related scientific laboratories.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Precise Timing and Astronomy	4.844	5.190	4.556	0.000	4.556
Articles:	-	-	-	-	-
Description: Research and development of improvements for the U.S. Master Clock (MC) System, the DoD Time Transfer capability, the Earth Orientation System, and the Astrometric Observation System.					

FY 2018 Plans:

- *Field operational Optical Fiber timing link in DC metro area
- *Lab demonstration of Optical clock prototype
- *Critical Time Dissemination Activities
- *Transition Earth Orientation Parameters (EOP) automation products to operations (Initial Operating Capability, IOC)
- *Begin 1.8m telescope enclosure at Naval Observatory Flagstaff Station
- *Test GPS-denied reference frame data pipeline
- *Preliminary Design Review (PDR) for transceiver for next generation time transfer

FY 2019 Base Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications		Project (Number/Name) 2344 / Precise Time and Astrometry		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
*Critical Design Review (CDR) for transceiver for next generation time transfer *Transition Earth Orientation Parameters (EOP) automation products to operations (Final Operating Capability, FOC) *Transition GPS-denied reference frame data pipeline to operations *Solar Lunar Almanac Core (SLAC) Shapiro illuminance model study/upgrade *System Requirements Review (SRR) for next generation infrared astrometric camera *Initiate development of prototype optical lattice clock (begin materials study)						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The decrease in funding from FY2018 to FY2019 is due to reduced investment in the next generation Master Clock and work on Earth Orientation Parameter (EOP) Optimization and Celestial Reference Frame (CRF) next generation instrumentation.						
Accomplishments/Planned Programs Subtotals		4.844	5.190	4.556	0.000	4.556
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
The included technology developments are primarily in-house with selected contractor participation. However, the Kokee Park, HI, radio telescope upgrade and the SW Correlator contract will involve substantial non-Navy contract support.						
E. Performance Metrics						
(1) The Software Correlator will complete Phase 2 and will achieve Initial Operational Capability (IOC). (2) FOC for antenna at Kokee Park, HI. (3) Rb Fountain System will reach FOC at AMC in FY18. (4) Delivery of first Next Generation Time Transfer transciever--transition to operations. (5) 1.8 meter Enclosure Fabrication						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications					Project (Number/Name) 2344 / Precise Time and Astrometry						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development (NPOI) 1.8m Telescope Project (1)	SS/FFP	Lowell Observatory : Flagstaff, AZ	0.000	0.200	Mar 2017	0.000		0.000		-		0.000	0.000	0.200	-
Primary Hardware Development (NPOI) 1.8m Telescope (2)	SS/FFP	AZ Embedded System : Not Specified	0.300	0.200	Aug 2017	0.000		0.000		-		0.000	0.000	0.500	-
Ancillary Hardware Development 1	Various	U.S. Naval Observatory : Washington, DC	0.085	0.070	Dec 2016	0.022	Dec 2017	0.044	Dec 2018	-		0.044	0.000	0.221	-
Ancillary Hardware Development 2	Various	U.S. Naval Observatory : Washington, DC	0.084	0.070	Jan 2017	0.022	Jan 2018	0.035	Jan 2019	-		0.035	0.000	0.211	-
Ancillary Hardware Development 3	Various	U.S. Naval Observatory : Washington, DC	0.122	0.070	Apr 2017	0.022	Apr 2018	0.035	Apr 2019	-		0.035	0.000	0.249	-
Ancillary Hardware Development 4	Various	U.S. Naval Observatory : Washington, DC	0.027	0.070	Jul 2017	0.022	Jul 2018	0.035	Jul 2019	-		0.035	0.000	0.154	-
Primary Hardware Development for CTD (System Integration)	C/FP	Classified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Primary Hardware Development for CTD (RF Interface)	MIPR	Classified : Not Specified	2.980	2.000	Mar 2017	0.780	Mar 2018	0.000		-		0.000	0.000	5.760	-
Primary Hardware Development for CTD (Line Interface)	MIPR	Classified : Not Specified	2.219	0.000		1.000	Mar 2018	0.000		-		0.000	0.000	3.219	-
Primary Hardware Development for CTD (Reference Upgrade)	C/FFP	Symmetricom : San Jose, CA	0.250	0.150	Jul 2017	0.000		0.000		-		0.000	0.000	0.400	-
Next Generation Secure Time Transfer	C/FFP	Classified : Not Specified	0.434	0.500	Jul 2017	0.273	Mar 2018	0.500	Mar 2019	-		0.500	0.565	2.272	-
1.8 meter infrared camera development	C/FFP	Classified : Not Specified	0.000	0.000		0.000		1.000	Jun 2019	-		1.000	4.249	5.249	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2344 / Precise Time and Astrometry							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development (Site Prep)	TBD	NASA/GSFC : HI	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Primary Hardware Development (Antenna Receiver Electronics)	C/FFP	NASA : GSFC	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
1.8 meter Telescope Enclosure	C/FFP	NAVFAC SW : Not Specified	0.000	0.000		1.800	Jun 2018	0.000		-		0.000	0.000	1.800	-
Advanced Time and Frequency Transfer Upgrade	C/FFP	Classified : Not Specified	0.000	0.000		0.000		0.500	Mar 2019	-		0.500	0.600	1.100	-
Optical Lattice Clocks	C/FFP	Classified : Not Specified	0.000	0.000		0.000		0.305	Mar 2019	-		0.305	0.600	0.905	-
Subtotal			7.501	3.330		3.941		2.454		-		2.454	6.014	23.240	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support (All PTA - Labor) 1	Allot	U.S. Naval Observatory (Civilian Labor) : Washington, DC	0.347	0.103	Dec 2016	0.138	Dec 2017	0.173	Dec 2018	-		0.173	Continuing	Continuing	Continuing
Development Support (All PTA - Labor) 2	Allot	U.S. Naval Observatory (Civilian Labor) : Washington, DC	0.347	0.103	Mar 2017	0.138	Mar 2018	0.173	Mar 2019	-		0.173	Continuing	Continuing	Continuing
Development Support (All PTA - Labor) 3	Allot	U.S. Naval Observatory (Civilian Labor) : Washington, DC	0.347	0.103	Jun 2017	0.138	Jun 2018	0.173	Jun 2019	-		0.173	Continuing	Continuing	Continuing
Development Support (All PTA - Labor) 4	Allot	U.S. Naval Observatory (Civilian	0.347	0.103	Jul 2017	0.138	Jul 2018	0.173	Jul 2019	-		0.173	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2344 / Precise Time and Astrometry							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Labor) : Washington, DC													
Software Development (EOP Automation)	C/FFP	U.S. Naval Observatory (Civilian Labor) : Washington, DC	1.024	0.356	Jun 2017	0.256	Jun 2018	0.611	Jun 2019	-		0.611	0.000	2.247	-
Travel 1	Allot	U.S. Naval Observatory (Civilian Travel) : Varies	0.022	0.010	Dec 2016	0.005	Oct 2017	0.000		-		0.000	0.000	0.037	-
Travel 2	Allot	U.S. Naval Observatory (Civilian Travel) : Varies	0.022	0.010	Jan 2017	0.005	Jan 2018	0.000		-		0.000	0.000	0.037	-
Travel 3	Allot	U.S. Naval Observatory (Civilian Travel) : Varies	0.023	0.010	Apr 2017	0.005	Apr 2018	0.000		-		0.000	0.000	0.038	-
Travel 4	Allot	U.S. Naval Observatory (Civilian Travel) : Varies	0.023	0.010	Jul 2017	0.005	Jul 2018	0.000		-		0.000	0.000	0.038	-
VLBI2010 Testing and Integration	MIPR	NASA : GSFC	0.444	0.461	Jun 2017	0.000		0.000		-		0.000	0.000	0.905	-
Software Development (SW Correlator GUI)	C/FFP	U.S. Naval Observatory : Washington, DC	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Astrometric Development	C/FFP	U.S. Naval Observatory : Washington, DC	0.242	0.245	Jul 2017	0.253	Jul 2018	0.240	Jul 2019	-		0.240	0.000	0.980	-
EOP Optimal Estimation	C/FFP	NASA : GSFC	0.000	0.000		0.000		0.125	Feb 2019	-		0.125	0.500	0.625	-
Foreign GNSS	C/FFP	Classified : Not Specified	0.000	0.000		0.000		0.125	Feb 2019	-		0.125	0.500	0.625	-
SLAC Software Upgrade	TBD	Not Specified : Not Specified	0.000	0.000		0.168	Jan 2018	0.309	Mar 2019	-		0.309	0.690	1.167	-
SIBR Placeholder	TBD	Not Specified : Not Specified	0.000	0.000		0.000		0.000	Jan 2019	-		0.000	0.000	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications						Project (Number/Name) 2344 / Precise Time and Astrometry			
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal		3.188	1.514		1.249		2.102		-	2.102	Continuing	Continuing	N/A
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total
Project Cost Totals		10.689	4.844		5.190		4.556		-	4.556	Continuing	Continuing	N/A

Remarks

Decrease between FY18 and FY19 reduces research and development efforts to enhance the DoD Precise Time and Time Interval (PTTI) infrastructure within the Critical Time Dissemination (CTD) project. The specific impacts are classified; however, the risk to these important Time and Frequency (T&F) nodes across the DoD not receiving this technical refresh and upgrade will be severely increased by lack of programmed transitions from these RDTEN activities.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603207N / Air/Ocean Tactical Applications

Project (Number/Name)

2344 / Precise Time and Astrometry

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2344 / Precise Time and Astrometry

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Precise Timing and Astronomy (PTA)				
Master Clock System: Rb Full Operational Capability (FOC) - AMC	3	2018	3	2018
Master Clock System: Optical Fiber Time (OFT) Transmission	3	2018	3	2018
Master Clock System: Fiber Time Transmission (FTT) in Baltimore/DC Area	2	2018	2	2018
Master Clock System: Fiber Time Transmission - Urban Demo	4	2018	4	2018
GPS M-Code Receiver: AF Operational Control Segment (OCX) Project Critical Design Review (CDR)	1	2018	4	2023
GPS M-Code Receiver: M-Code IOC at USNO	2	2019	2	2019
GPS M-Code Receiver: M-Code FOC at USNO	4	2020	4	2020
VLBI DAS at Kokee Park: VLBI Telescope IOC	2	2018	2	2018
VLBI DAS at Kokee Park: VLBI Telescope Final Integration	2	2018	2	2018
VLBI DAS at Kokee Park: VLBI Telescop FOC	4	2018	4	2019
1.8m Telescope Deployment: FAC-D Development for Telescope Enclosure	3	2018	2	2023
1.8m Telescope Deployment: Flagstaff Site Telescope Enclosure Fabrication	3	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2363 / Remote Sensing Capability Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2363: <i>Remote Sensing Capability Development</i>	7.355	3.773	3.959	0.324	-	0.324	0.327	0.328	0.328	0.000	0.000	16.394	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		

Note
\$5.642M of FY19 funding was realigned from Program Element (PE) 0603207N Project Unit 2363 into PE 0604218N Air Ocean Equipment Engineering Project Unit 2363 Remote Sensing Capability Development as a result of a Budget Activity (BA) reclassification.

A. Mission Description and Budget Item Justification
Remote Sensing Capability Development characterizes the ocean environment using a variety of remote sensing techniques that provide that capability to discriminate atypical oceanographic phenomena from the natural environment that will greatly improve undersea dominance capabilities. The Naval Oceanographic Office will employ oceanographic data to refine and extend environmental characterization of the phenomena and disseminate data to the Fleet.

FY 2019 request provides for continued target data collection, enhancements on algorithms and continue to integrate algorithms for access over the network.

FY19 funds are to develop and deliver algorithms in support of the Remote Sensing Capability Development (RSCD) project and will support Fleet Anti-Submarine Warfare (ASW) and Mine Warfare (MIW) missions.

Remote Sensing Capability Development characterizes ocean environment using a variety of remote sensing techniques that provide that capability to discriminate atypical oceanographic phenomena from the natural environment that will greatly improve undersea dominance capabilities. The Naval Oceanographic Office will employ oceanographic data to refine and extend environmental characterization of the phenomena and disseminate data to the Fleet.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Remote Sensing Capability Development FY 2018 Plans: Continue data collection in various weather and sea states to broaden the range of environmental conditions and reduce uncertainty in environmental prediction. Continue software algorithm performance analysis. Continue software algorithm enhancements to automatically detect oceanographic phenomena. Continue software algorithm enhancements and modifications to support transition to a new architecture. Continue to implement the algorithm performance assessment strategy as well as the test and evaluation plans. Document software algorithm test reports. Conduct algorithm Integration Decision. Continue to integrate algorithms for access over	3.563 -	3.899 -	0.000 -	0.000 -	0.000 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2363 / Remote Sensing Capability Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
the network. Continue development of training to provide the user community education on using the different tools and applications. Coordinate Task, Collect, Process, Exploit, Disseminate (TCPED) process amongst inter-agencies to support Navy Missions.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: \$5.642M of FY19 funding was realigned from Program Element (PE) 0603207N Project Unit 2363 into 0604218N Air Ocean Equipment Engineering Project 2363 Remote Sensing Capability Development as a result of a Budget Activity (BA) reclassification.						
Title: Remote Sensing Capability Dev. Articles:		0.210	0.060	0.324	0.000	0.324
Description: Collect remote sensing and ground truth data in various weather and sea states to broaden the range of environmental conditions and reduce uncertainty in environmental prediction. Develop and enhance software algorithms to automatically detect oceanographic phenomena. Integrate algorithms for access over the network. Enhance existing toolsets to provide users robust applications to assist in their daily tasks. Develop training to provide the user community education on using the different tools and applications. (Details held at a higher classification)		-	-	-	-	-
FY 2018 Plans: Continue efforts to coordinate the TCPED process across DoD and civilian government agencies to support Navy Missions. Supported transition of SEAHORSE algorithms to operations.						
FY 2019 Base Plans: Increase investment in new technology that allows for an accelerated pace to detect oceanographic phenomena of ocean science transitions in the interest of national security for Task Force Ocean.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2363 / Remote Sensing Capability Development	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018
Funding increased from FY2018 (PE 0603207N) to FY2019 to expand scope of surface ship detection algorithms for SEAHORSE/Remote Sensing Capability Development based on emerging threats.			FY 2019 Base	FY 2019 OCO
Accomplishments/Planned Programs Subtotals		3.773	3.959	0.324
C. Other Program Funding Summary (\$ in Millions)		0.000	0.324	
Remarks				
D. Acquisition Strategy Remote Sensing Capability Development is being managed as a Program Executive Office (PEO) Project, via a Project Definition Document (PDD) construct for acquisition rigor and oversight. Remote Sensing Capability Development is being managed as a PEO Project leveraging the Rapid Development and Deployment (RDD) construct for rigor and discipline.				
E. Performance Metrics Available in the Project's Requirements Definition Package (RDP). Classified performance metrics are available in the Project's Requirements Definition Package (RDP) approved 14 July 2015				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2363 / Remote Sensing Capability Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remote Sensing Capability Development Data Collection	C/FFP	SAIC : Virginia	1.284	0.497	Feb 2017	0.521	Feb 2018	0.000		-		0.000	0.000	2.302	-
Remote Sensing Capability Development Data Collection	WR	NRL : Washington, DC	1.212	0.730	Nov 2016	0.944	Nov 2017	0.000		-		0.000	0.000	2.886	-
Remote Sensing Capability Development Data Collection	C/FFP	Raytheon : MA	1.070	0.000	Apr 2017	0.000		0.000		-		0.000	0.000	1.070	-
Remote Sensing Capability Development Data Collection	WR	NUWC : Keyport, WA	0.232	0.000		0.000		0.000		-		0.000	0.000	0.232	-
Remote Sensing Capability Development Data Collection	C/FFP	Cubic : San Diego, CA	0.000	1.041	Apr 2017	1.068	Apr 2018	0.000		-		0.000	0.000	2.109	-
REMOTE SENSING CAPABILITY DEVELOPMENT DATA COLLECTION	Various	VARIOUS : VARIOUS	0.000	0.210	Jan 2017	0.060	Jan 2018	0.324	Jan 2019	-		0.324	5.176	5.770	-
Subtotal		3.798	2.478		2.593		0.324		-			0.324	5.176	14.369	N/A

Remarks
Due to a change in contract strategy funds were sent to Cubic vice Raytheon beginning in FY17.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remote Sensing Capability Development Data Collection	WR	SSC PAC : San Diego, CA	0.472	0.495	Feb 2017	0.536	Mar 2018	0.000		-		0.000	0.000	1.503	-
Subtotal		0.472	0.495		0.536		0.000		-			0.000	0.000	1.503	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 2363 / Remote Sensing Capability Development							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remote Sensing Capability Development Data Collection	WR	SSC PAC : San Diego, CA	1.122	0.800	Feb 2017	0.830	Mar 2018	0.000		-		0.000	0.000	2.752	-
Remote Sensing Capability Development Data Collection	WR	SSC Pacific : SAN DIEGO, CA	1.081	0.000		0.000		0.000		-		0.000	0.375	1.456	-
Subtotal		2.203	0.800		0.830		0.000		-			0.000	0.375	4.208	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remote Sensing Capability Development Data Collection	C/FP	BAH : Virginia	0.345	0.000		0.000		0.000		-		0.000	0.000	0.345	-
Remote Sensing Capability Development Data Collection	C/FP	BAH : VA	0.537	0.000		0.000		0.000		-		0.000	0.374	0.911	-
Subtotal		0.882	0.000		0.000		0.000		-			0.000	0.374	1.256	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			7.355	3.773		3.959		0.324		-		0.324	5.925	21.336	N/A
Remarks															

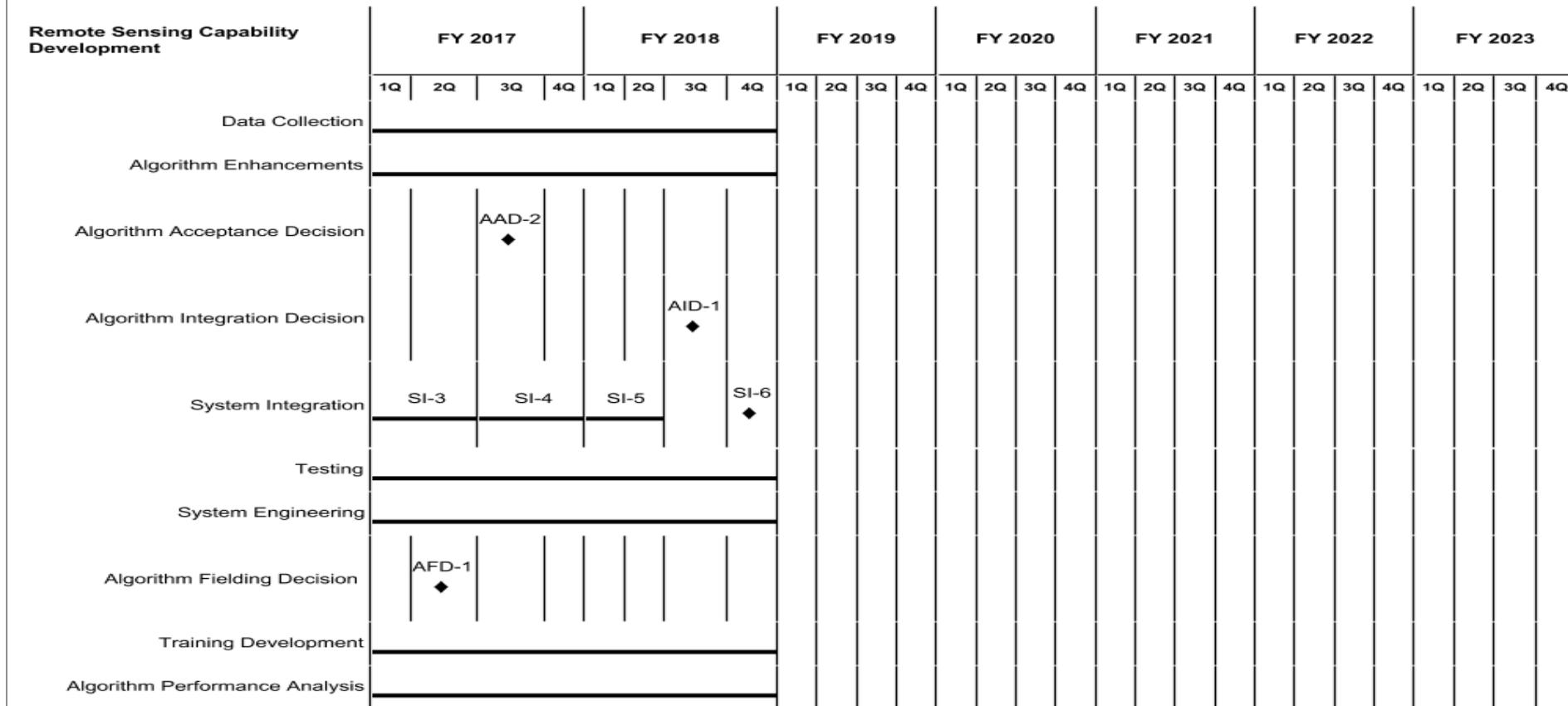
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603207N / Air/Ocean Tactical
Applications**Project (Number/Name)**2363 / Remote Sensing Capability
Development

2019PB - 0603207N - 2363.L39

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 2363 / Remote Sensing Capability Development		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Remote Sensing Capability Development				
Data Collection:		1	2017	4
Algorithm Enhancements:		1	2017	4
Algorithm Acceptance Decision: Algorithm Acceptance Decision 2		3	2017	3
Algorithm Integration Decision: Algorithm Integration Decision 1		3	2018	3
System Integration: System Integration 3		1	2017	2
System Integration: System Integration 4		3	2017	4
System Integration: System Integration 5		1	2018	2
System Integration: System Integration 6		4	2018	4
Testing:		1	2017	4
System Engineering:		1	2017	4
Algorithm Fielding Decision: Algorithm Fielding Decision 1		2	2017	2
Training Development:		1	2017	4
Algorithm Performance Analysis:		1	2017	4
Remote Sensing Capability Dev.				
Data Collection:: Schedule Detail		1	2017	2
Algorithm Development:: Schedule Detail		1	2017	4
Application Development:: Schedule Detail		1	2017	4
System Integration:: Schedule Detail		3	2017	4
Testing:: Schedule Detail		1	2017	4
System Engineering:: Schedule Detail		1	2017	4
Training Development:: Schedule Detail		1	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 3207 / Fleet Synthetic Training			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3207: Fleet Synthetic Training	1.466	0.933	0.253	0.266	-	0.266	0.283	0.305	0.326	0.332	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Fleet Synthetic Training (FST) provides Naval Forces with an enhanced in-port training capability. Integrating embedded shipboard training devices, aircraft and submarine simulators into an interoperable network with joint, coalition and interagency partners will provide more effective training for our deploying naval forces.

A key factor in achieving this new way of training our Naval Forces is to ensure that the required training is based on realistic characterizations of the physical environment. This project develops and delivers software that characterizes the ocean and atmospheric environments; adjusts to meet fleet-required training scenarios; allows synthetic training to be conducted in areas of planned and contingency operations; and, provides sufficient detail to simulate the real-world conditions of the physical environment in those areas of interest.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Fleet Synthetic Training Description: Ballistic Missile Defense (BMD) Fleet Synthetic Training (FST) at sea effort will provide the capability to conduct integrated Live, Virtual and Constructive (LVC) single or multi-ship exercises with ships at sea using the Navy Continuous Training Environment (NCTE). This capability will support BMD mission area Fleet training and mission rehearsal in theater, allow ships to participate in Combatant Command (COCOM) mandated BMD exercises while pier-side or underway, as well as enhance BMD training objective accomplishment in current Fleet Readiness Training Plan (FRTP) underway training events such as Composite Training Unit Exercises (COMPTUEX) and Joint Task Force Exercises (JTFEX). The NCTE and FST directly support Fleet training readiness, strike group and BMD platform deployment certifications. FY 2018 Plans: *Develop Machine-to-Machine (M2M) capability for Environmental Data Cube Support System (EDCSS) interface in support of environmental product generation. *Research possible Fleet Synthetic Training (FST) integration into advanced Training (Integrated team trainers, warfighting development center support, etc.) *Research/Implement live virtual constructive capability leveraging virtual testbed and Full Motion Video/Joint Semi-Automatic Forces/Next Generation Threat System research.	0.933	0.253	0.266	0.000	0.266
Articles:	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3207 / Fleet Synthetic Training	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
*Develop support for Electromagnetic Spectrum Maneuver Warfare (EMMW) leveraging Full Motion Video/Joint Semi-Automatic Forces/Next Generation Threat System research. FY 2019 Base Plans: *Research Fleet Synthetic Training (FST) integration into advanced Training (Integrated team trainers, warfighting development center support, etc.) *Research/Implement live virtual constructive capability leveraging virtual testbed and Full Motion Video/Joint Semi-Automatic Forces/Next Generation Threat System research. *Develop support for Electromagnetic Spectrum Maneuver Warfare (EMMW) leveraging Full Motion Video/Joint Semi-Automatic Forces/Next Generation Threat System research. *Research/Develop use of FST for Basic/Integrated phase certification of Strike Group Oceanography Teams.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Increase FY18 and FY19 supports cost of advance technology to support Ballistic Missile Defense Fleet Synthetic Training to provide integrated live, virtual and constructive single or multi-ship exercises.				
Accomplishments/Planned Programs Subtotals				0.933 0.253 0.266 0.000 0.266
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy The included technology developments are primarily in-house with contractor participation through existing vehicles.				
E. Performance Metrics <ol style="list-style-type: none"> 1) The Navy will produce meteorological and oceanographic environmental databases for all NCTE exercise areas. Will implement, test, and integrate with Joint Semi Automated Forces (JSAF) and other federates in accordance with requirements. 2) The Navy will complete data and architecture integration, including information assurance compliance for provision of synthetic meteorological and oceanographic data to the NCTE. Data and products will be available via NEP-Oc, DVD and/or Machine-to-Machine (M2M) during planning and execution of FST events. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / <i>Air/Ocean Tactical Applications</i>	Project (Number/Name) 3207 / <i>Fleet Synthetic Training</i>
3) The Navy will produce products based on synthetic ocean environment and synthetic satellite/radar imagery based on meteorological environmental data for all NCTE exercise areas. Products are utilized in planning and execution of FST events.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 3207 / Fleet Synthetic Training								
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Development Support	WR	AER : VA	0.258	0.300	Jan 2017	0.083	Jan 2018	0.000	-	-	0.000	Continuing	Continuing	Continuing		
Software Development	WR	Not Specified : Not Specified	0.070	0.142	Jan 2017	0.041	Jan 2018	0.000	-	-	0.000	Continuing	Continuing	Continuing		
Configuration Management	WR	AER : VA	0.269	0.100	Jan 2017	0.039	Jan 2018	0.000	-	-	0.000	0.000	0.408	-		
Studies and Analysis	Various	AER : VA	0.369	0.100	Apr 2017	0.039	Apr 2018	0.000	-	-	0.000	0.000	0.508	-		
Award Fees	WR	NAWC TSD (Orlando, FL) : Not Specified	0.057	0.036	Jan 2017	0.012	Jan 2018	0.000	-	-	0.000	0.000	0.105	-		
Technical Data	WR	Not Specified : Not Specified	0.119	0.000		0.000		0.000	-	-	0.000	0.000	0.119	-		
Subtotal			1.142	0.678		0.214		0.000		-	-	0.000	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Operational Test & Evaluation	WR	AER : VA	0.171	0.150	Jan 2017	0.000		0.000	-	-	0.000	0.000	0.321	-		
Development Test and Evaluation	WR	AER : VA	0.153	0.105	Jan 2017	0.039	Jan 2018	0.266	Jan 2019	-	-	0.266	0.000	0.563	-	
Subtotal			0.324	0.255		0.039		0.266		-	-	0.266	0.000	0.884	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				1.466	0.933		0.253		0.266		-	-	0.266	Continuing	Continuing	N/A

Remarks

Increase FY18 and FY19 supports cost of advance technology to support Ballistic Missile Defense Fleet Synthetic Training to provide integrated live, virtual and constructive single or multi-ship exercises.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018
Appropriation/Budget Activity				R-1 Program Element (Number/Name)								Project (Number/Name)			
1319 / 4				PE 0603207N / Air/Ocean Tactical Applications								3207 / Fleet Synthetic Training			
Proj 3207															
FY 2017				FY 2018				FY 2019				FY 2020			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Fleet Synthetic Training: Database Development:	[REDACTED]														
Fleet Synthetic Training: Architecture:	[REDACTED]														
Fleet Synthetic Training: Performance Surface Improvements:	[REDACTED]														
Fleet Synthetic Training: Development Work:	[REDACTED]														
Fleet Synthetic Training: Studies:	[REDACTED]														

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3207 / Fleet Synthetic Training		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 3207</i>				
Fleet Synthetic Training: Database Development:		2	2017	4
Fleet Synthetic Training: Architecture:		2	2017	4
Fleet Synthetic Training: Performance Surface Improvements:		2	2017	4
Fleet Synthetic Training: Development Work:		2	2017	4
Fleet Synthetic Training: Studies:		2	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)						
1319 / 4					PE 0603207N / Air/Ocean Tactical Applications				3404 / <i>Tactical Environmental Support</i>						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
3404: <i>Tactical Environmental Support</i>	0.000	0.000	0.327	2.595	-	2.595	2.616	2.643	2.671	2.685	Continuing	Continuing			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-					
A. Mission Description and Budget Item Justification															
The Tactical Environmental Support Project (3404) enables the future warfighter to leverage environmental data gathered, assimilated and predicted under Projects 2341 (METOC Collections) and 2342 (METOC processing) by incorporating them into warfighting technological, net-centric applications that shape the way in which commanders engage the enemy, take full advantage of environmental conditions (and their impacts on systems and sensors) and complete the mission in the most efficient manner feasible. These software decision support tools complement the capabilities found in the NITES-Next Program of Record, and provide platform, sensor, communications, and weapon systems performance assessments for littoral and deep-strike warfighters. The following warfighting disciplines benefit directly from these METOC Exploitation capabilities: (1) Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare, (AAW), Strike Warfare (STW), Expeditionary Warfare (EXW), Electronic Warfare (EW), Information Operations (IO), Intelligence Operations (INT), Non-Combat Operations (NCO), Command, Control, Communication (CCC), and Naval Special Warfare (NSW).															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Tactical Environmental Support Articles:											0.000	0.327	2.595	0.000	2.595
Description: The Tactical Environmental Support Project (3404) enables the future warfighter to leverage environmental data gathered, assimilated and predicted under Projects 2341 (METOC Collections) and 2342 (METOC processing) by incorporating them into warfighting technological, net-centric applications that shape the way in which commanders engage the enemy, take full advantage of environmental conditions (and their impacts on systems and sensors) and complete the mission in the most efficient manner feasible. These software decision support tools complement the capabilities found in the NITES-Next POR, and provide platform, sensor, communications, and weapon systems performance assessments for littoral and deep-strike warfighters. The following warfighting disciplines benefit directly from these METOC Exploitation capabilities: (1) Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare, (AAW), Strike Warfare (STW), Expeditionary Warfare (EXW), Electronic Warfare (EW), Information Operations (IO), Intelligence Operations (INT), Non-Combat Operations (NCO), Command, Control, Communication (CCC), and Naval Special Warfare (NSW).											-	-	-	-	
Accomplishments and plans described below are examples for each effort category.															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3404 / <i>Tactical Environmental Support</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: <ul style="list-style-type: none">- Continue: Provide a new ashore (reach back) radar/radio frequency (RF) and electro-optical (EO) performance products system that is modular, extensible, and high fidelity environmental model-driven that can serve as a replacement for the current tactical decision aids (TDAs) for RF: AREPS (Advanced Refractive Effects Prediction System), and EO: TAWS (Target Acquisition Weapons Software).- Continue: Enhance TrueView/Builder to maximize impact on and relevance to Navy and Marine Corps operations; make it fully compatible with Navy and Marine Corps operational computer systems and networks.- Continue: Leverage The Scalable Tactical Acoustic Propagation Loss Engine (STAPLE) Transitions project to support on-going transition of OAML model and database improvements into STAPLE in order to provide a common core element to a large number of Fleet ASW tactical and high fidelity training systems.- Continue: Improve Parabolic Equation (PE) modeling of passive sonar performance modeling within the TOPSIDE mission planner for regional ASW modeling; improve the physics and utility of the RAM/Seahawk model to extend to higher frequencies.- Continue: Evaluate and develop algorithms that leverage optical remote sensing data from Sentinel-3A, JPSS-1 VIIRS, Sentinel-3B and work toward transition of algorithms.- Continue: Improve the Naval Research Laboratory Atmospheric Acoustic Propagation (NRLAAP) system by developing new multi-vehicle simulation capabilities, incorporating the effects of propagation and ambient noise uncertainty/variability into probability of detection calculations, and improving the efficiency of the model calculations by incorporating advances from the NRL base program "Atmospheric environmental acoustic features for reduction of performance prediction time".- Continue: Work toward EPMA improvements, including: (1) New services to modernize MIW databases for imagery; (2) Refresh of environmental workflows for Bathymetry, Salinity, Temperature, Optics, and Currents; (3) Integration with new Mine Contact Database; (4) Define requirements for integration with Net-Centric Sensor Analysis for Mine Warfare (NSAM), NAVSEA Surface Mine Warfare Program (PMS-495), Naval Surface Warfare Center - Panama City Division (NSWC-PCD); (5) Demonstrate interoperability with latest NSAM service architecture.- Continue: Provide automated mission-relevant water sampling plans with joint optimization of varied observing systems: gliders, profiling floats, shipboard, satellite, buoy, air-deployed, etc.- Continue: Improvement and validation of the Navy Surface Layer Atmospheric Model (NAVSLaM), based on evaluation of recent applied research results and the availability of experimental datasets and produce a sample near-surface Cn2 (turbulence) climatology database for evaluation purposes.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3404 / <i>Tactical Environmental Support</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>- Begin: Improve Builder software to include Bragg Line analysis, upgrades to the Ionospheric model and upgrades to output metadata.</p> <p>FY 2019 Base Plans:</p> <ul style="list-style-type: none">- Complete: Provide a new ashore (reach back) radar/radio frequency (RF) and electro-optical (EO) performance products system that is modular, extensible, and high fidelity environmental model-driven that can serve as a replacement for the current tactical decision aids (TDAs) for RF: AREPS (Advanced Refractive Effects Prediction System), and EO: TAWS (Target Acquisition Weapons Software).- Continue: Improve Builder software to include Bragg Line analysis, upgrades to the Ionospheric model and upgrades to output metadata.- Complete: Enhance TrueView/Builder to maximize impact on and relevance to Navy and Marine Corps operations; make it fully compatible with Navy and Marine Corps operational computer systems and networks.- Complete: Leverage The Scalable Tactical Acoustic Propagation Loss Engine (STAPLE) Transitions project to support on-going transition of OAML model and database improvements into STAPLE in order to provide a common core element to a large number of Fleet ASW tactical and high fidelity training systems.- Complete: Improve Parabolic Equation (PE) modeling of passive sonar performance modeling within the TOPSIDE mission planner for regional ASW modeling; improve the physics and utility of the RAM/Seahawk model to extend to higher frequencies.- Complete: Evaluate and develop algorithms that leverage optical remote sensing data from Sentinel-3A, JPSS-1 VIIRS, Sentinel-3B and work toward transition of algorithms.- Complete: Improve the Naval Research Laboratory Atmospheric Acoustic Propagation (NRLAAP) system by developing new multi-vehicle simulation capabilities, incorporating the effects of propagation and ambient noise uncertainty/variability into probability of detection calculations, and improving the efficiency of the model calculations by incorporating advances from the NRL base program "Atmospheric environmental acoustic features for reduction of performance prediction time".- Complete: Work toward EPMA improvements, including: (1) New services to modernize MIW databases for imagery; (2) Refresh of environmental workflows for Bathymetry, Salinity, Temperature, Optics, and Currents; (3) Integration with new Mine Contact Database; (4) Define requirements for integration with Net-Centric Sensor Analysis for Mine Warfare (NSAM), PMS-495, NSWC-PCD; (5) Demonstrate interoperability with latest NSAM service architecture.- Complete: Provide automated mission-relevant water sampling plans with joint optimization of varied observing systems: gliders, profiling floats, shipboard, satellite, buoy, air-deployed, etc.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications		Project (Number/Name) 3404 / <i>Tactical Environmental Support</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
<p>- Complete: Improvement and validation of the Navy Surface Layer Atmospheric Model (NAVSLaM), based on evaluation of recent applied research results and the availability of experimental datasets and produce a sample near-surface Cn2 (turbulence) climatology database for evaluation purposes.</p> <p>- Initiate: Leverage lessons learned from NAVSLaM to create a holistic approach to atmospheric boundary layer turbulence observation, data-basing and modeling, as they pertain to Navy tactical problems.</p> <p>- Initiate: Enhancements to newly fielded RF and EO capability that incorporates Fleet user feedback and tactical lessons learned.</p> <p>- Initiate: Explore synergies with other DoD ocean observation system initiatives in order to rapidly advance and scale-up Navy ocean observation systems, data exfiltration, data assimilation and forward modeling capabilities.</p> <p>- Initiate: Fully explore artificial intelligence (AI) and machine learning aspects of EPMA, to include optimization within private cloud and "big data analytics" architectures. Incorporate "mirrored" test and evaluation computational environments when fielding new EPMA capabilities.</p> <p>- Initiate: Develop technologies that will improve NAVAIR's ability to quickly integrate newly developed NRLAAP capabilities.</p> <p>- Initiate: Explore options in terms of long-term, state-of-the-art maintenance of and improvements to PE and ASW modeling.</p> <p>- Initiate: Explore means of integrating STAPLE with newly developed cloud-based OAML software distribution capability.</p> <p>- Initiate: Make additional modifications to TrueView/Builder in order to meet new Fleet operational and Cyber requirements in an agile manner.</p> <p>- Initiate: Leverage lessons learned from remote sensing data algorithms for use in SmallSats and other newly emerging remote sensing technologies.</p>					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Funding Increases from FY2018 to FY2019 is due to realignment of resources within PE 0603207N Project Unit/LI 2341 METOC Data Acquisition for follow-on efforts that will more fully transition tactical environmental technologies into Fleet operations, as well as address operational lessons learned from fielding of recently introduced technologies. This feedback mechanism enables agility, thus accelerating the improvement of capabilities that provide a distinct tactical advantage to the Fleet and Marine Corps.					
Accomplishments/Planned Programs Subtotals			0.000	0.327	2.595
0.000			0.000	2.595	2.595

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3404 / <i>Tactical Environmental Support</i>
C. Other Program Funding Summary (\$ in Millions)		
N/A		
Remarks		
D. Acquisition Strategy Acquisition, management and contracting strategies are to support the Tactical Environmental Support Project to develop, demonstrate and validate products and decision aids to understand and predict the impact of the environment on military operations.		
E. Performance Metrics Goal: Develop techniques and tools to transform traditional METOC predicted variables into more directly tactically relevant variables, and allow METOC personnel and others to understand the impact of the environment on sensors, communications, and weapons. Focus areas include, but are not limited to, electromagnetic maneuver warfare, electro-optical impacts (of environment on sensors and weapons systems), and antisubmarine warfare. Metric -- Tasks will address no less than 75% of applicable capability gaps and requirements.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 3404 / Tactical Environmental Support							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Tactical Environmental Support	WR	NRL : Washington, DC	0.000	0.000		0.145	Nov 2017	2.283	Nov 2018	-		2.283	0.000	2.428	-
METOC Tactical Environmental Support	WR	NRL : Monterey, CD Stennis Space Center, MS	0.000	0.000		0.182	Nov 2017	0.312	Nov 2018	-		0.312	Continuing	Continuing	Continuing
METOC Tactical Environmental Support-Staple Transitions	WR	NSWC Carderock : West Bethesda, MD	0.000	0.000		0.000	Nov 2017	0.000		-		0.000	2.500	2.500	-
METOC Tactical Environmental Support	C/FFP	Various : Various	0.000	0.000		0.000	Nov 2017	0.000		-		0.000	0.075	0.075	-
Subtotal			0.000	0.000		0.327		2.595		-		2.595	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.327		2.595		-		2.595	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy														Date: February 2018												
Appropriation/Budget Activity							R-1 Program Element (Number/Name)							Project (Number/Name)												
1319 / 4							PE 0603207N / Air/Ocean Tactical Applications							3404 / Tactical Environmental Support												
							FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023	
							1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3404																										
Page/GrouAsset Allocation & Mission Planning: ASW RBC Delivery: ASW RBC Delivery 3p/Row: Schedule Detail							██████████																			
Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail: Schedule Detail							██████████																			
Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail: Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 2: Schedule Detail							██████████																			
Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail: Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 3: Schedule Detail														██████████												
Staple Upgrade																										
STAPLE Upgrades: STAPLE Delivery 12: SD-12							██████████																			
STAPLE Upgrades: STAPLE Delivery 13: SD-13							██████████																			
STAPLE Upgrades: STAPLE Delivery 14: SD-14														██████████												
MIW TDA Support: EPMA-NSMA Integration 2: NSMA 12							██████████																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3404 / <i>Tactical Environmental Support</i>		
Schedule Details				
Events by Sub Project		Start	End	
Quarter	Year	Quarter	Year	
Proj 3404				
Page/GrouAsset Allocation & Mission Planning: ASW RBC Delivery: ASW RBC Delivery 3p/Row: Schedule Detail	4	2018	4	2018
Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail: Schedule Detail	4	2018	4	2018
Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail: Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 2: Schedule Detail	4	2018	4	2018
Descriptive Dynamic Oceanography Assessment Tool: Schedule Detail: Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 3: Schedule Detail	4	2020	4	2020
Staple Upgrade				
STAPLE Upgrades: STAPLE Delivery 12: SD-12	1	2018	4	2018
STAPLE Upgrades: STAPLE Delivery 13: SD-13	1	2019	1	2019
STAPLE Upgrades: STAPLE Delivery 14: SD-14	1	2020	1	2020
MIW TDA Support: EPMA-NSMA Integration 2: NSMA 12	4	2018	4	2018
MIW TDA Support: EPMA-NSMA Integration 3: NSMA 13	4	2019	4	2019
Descriptive Dynamic Oceanography Assessment Tool: NEXGEN ASW RBC GIS TOOLSET: NEXGEN ASW RBC GIS TOOLSET 3				
ISTAPLE Upgrades: STAPLE Delivery 12: ISTAPLE Upgrades: STAPLE Delivery 12	4	2018	4	2018
ISTAPLE Upgrades: STAPLE Delivery 13: STAPLE Upgrades: STAPLE Delivery 13	1	2019	4	2019
ISTAPLE Upgrades: STAPLE Delivery 14: STAPLE Upgrades: STAPLE Delivery 14	1	2020	1	2020
MIW TDA Support: EPMA-NSMA Integration 2: MIW TDA Support: EPMA-NSMA Integration 2	1	2018	1	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3404 / <i>Tactical Environmental Support</i>		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
MIW TDA Support: EPMA-NSMA Integration 3: MIW TDA Support: EPMA-NSMA Integration 3	1	2019	1	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603207N / Air/Ocean Tactical Applications				3405 / Decision Support Products & Dissemination				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3405: Decision Support Products & Dissemination	0.000	0.000	0.327	1.094	-	1.094	1.115	1.144	1.171	1.186	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Decision Support Products & Dissemination efforts enable the future warfighter to leverage environmental data gathered, assimilated, predicted and exploited by optimizing data formatting, compression, packaging, depiction, data-basing and transfer methodologies that permit the rapid dissemination of actionable battlespace environmental (METOC) information over tactical and reach-back networks. This project ensures warfighters, commanders and those who support them are fully synchronized in terms of environmental data products shared among a multitude of platforms, systems and common operating pictures (COPs). METOC information is highly dynamic. Just as time synchronization is essential to navigation principles, timely METOC knowledge and information are vital to battlespace environmental exploitation, placing the warfighter and support elements in spatial and temporal synchronization, and at a collective advantage, in terms of the current and predicted states of the ocean and atmosphere.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Decision Support Products & Dissemination Articles:	0.000	0.327	1.094	0.000	1.094
Description: The Decision Support Products and Dissemination Project (3405) enables the future warfighter to leverage environmental data gathered, assimilated, predicted and exploited under Projects 2341 (METOC Collections), 2342 (METOC processing) and 3404 (METOC exploitation) by optimizing data formatting, compression, packaging, depiction, data-basing and transfer methodologies that permit the rapid dissemination of actionable battlespace environmental (METOC) information over tactical and reach-back networks. This project ensures warfighters, commanders and those who support them are fully synchronized in terms of environmental data products shared among a multitude of platforms, systems and common operating pictures (COPs). METOC information is highly dynamic. Just as time synchronization is essential to navigation principles, timely METOC knowledge and information synchronization is vital to battlespace environmental exploitation, placing the warfighter and all of those who support him on the "same sheet of music" and at a collective advantage, in terms of the current and predicted states of the ocean and atmosphere.	-	-	-	-	-

Accomplishments and plans described below are examples for each effort category.

FY 2018 Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3405 / Decision Support Products & Dissemination				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue: Mature the A3PET capabilities already demonstrated in the prototype; provide an intuitive, interactive user interface, and provide a service application programming interface (API) for potential programmatic use by backend components in the future.						
- Continue: Provide acoustically consistent oceanographic confidence estimates based on current continuous ocean model/data comparisons for the Navy's operational ocean and acoustics communities.						
- Initiate: Evaluate global ocean analyses and forecasts from different national/international centers, with respect to both hydrographic and acoustic properties.						
- Initiate: Develop ship routing and base preparedness algorithms so that they can be employed on the following systems: the Automated Tropical Cyclone Forecast System (ATCF), the Joint METOC Viewer (JMV), and the Advanced Weather Interactive Processing System Version II (AWIPS II).						
FY 2019 Base Plans:						
- Continue: Evaluate global ocean analyses and forecasts from different national/international centers, with respect to both hydrographic and acoustic properties.						
- Continue: Develop ship routing and base preparedness algorithms so that they can be employed on the following systems: the Automated Tropical Cyclone Forecast System (ATCF), the Joint METOC Viewer (JMV), and the Advanced Weather Interactive Processing System Version II (AWIPS II).						
- Complete: Provide acoustically consistent oceanographic confidence estimates based on current continuous ocean model/data comparisons for the Navy's operational ocean and acoustics communities.						
- Complete: Mature the Advanced Air ASW Planning abs Evaluation Tool (A3PET) capabilities already demonstrated in the prototype; provide an intuitive, interactive user interface, and provide a service application programming interface (API) for potential programmatic use by backend components in the future.						
- Initiate: Explore the use of oceanographic confidence estimates derived from model/data comparisons to improve Navy ocean and acoustic models and tactical decision aids.						
- Initiate: Leverage lessons learned from ocean analysis and forecast evaluations in order to improve databases, data assimilation techniques and ocean and acoustic models in a more synergistic way.						
- Initiate: Leverage lessons learned from A3PET to create a holistic approach to real-time ASW mission planning and re-tasking by exploring machine learning, high-performance computing, cloud computing and "big data analytics" aspects of the ASW mission planning and associated ocean environment problem.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3405 / Decision Support Products & Dissemination				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Funding Increases from FY2018 to FY2019 due to realignment of resources from Project Unit (PU)/LI 2342 METOC Data Acquisition which will result in follow-on efforts that more fully address the needs of Fleet and Marine Corps decision makers, to include technologies that fully integrate state-of-the-art and tactically-relevant atmospheric and ocean modeling capabilities as well as state-of-the-art information technologies such as cloud-based and high-performance computing, as well as "big data analytics" and machine learning.						
Accomplishments/Planned Programs Subtotals		0.000	0.327	1.094	0.000	1.094
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
Acquisition, management and contracting strategies are to support the Decision Support Products & Dissemination Project to develop, demonstrate and validate products and decision aids to provide environmentally based recommendations to commanders at the Strategic, Operational, and Tactical levels of military operations.						
E. Performance Metrics						
Goal: Develop techniques and tools to provide tactially relevant METOC based advice to military commanders. Focus areas include, but are not limited to, electromagnetic maneuver warfare, electro-optical impacts (of environment on sensors and weapons systems), and antisubmarine warfare. Metric -- Tasks will address no less than 75% of applicable capability gaps and requirements.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications				Project (Number/Name) 3405 / Decision Support Products & Dissemination							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Tactical Environmental Support	WR	NRL : Washington DC	0.000	0.000		0.111	Nov 2017	0.232	Nov 2018	-		0.232	0.000	0.343	-
METOC Tactical Environmental Support	WR	NRL : Monterey, CA; Dtensis Space Center, MS	0.000	0.000		0.100	Nov 2017	0.100	Nov 2018	-		0.100	Continuing	Continuing	Continuing
METOC Tactical Environmental Support	C/FFP	Various : Various	0.000	0.000		0.116	Nov 2017	0.762	Nov 2018	-		0.762	0.000	0.878	-
Subtotal			0.000	0.000		0.327		1.094		-		1.094	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.327		1.094		-		1.094	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy														Date: February 2018										
Appropriation/Budget Activity							R-1 Program Element (Number/Name)							Project (Number/Name)										
1319 / 4							PE 0603207N / Air/Ocean Tactical Applications							3405 / Decision Support Products & Dissemination										
METOC Decision Support Products & Dissemination																								
FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Decision Support & Performance Prediction Tools:: ASW continuous probability of detection algorithm: Decision Support & Performance Prediction Tools 1							[REDACTED]																	
Decision Support & Performance Prediction Tools:: Global ocean model skill competitiveness: Decision Support & Performance Prediction Tools 2							[REDACTED]																	
Decision Support & Performance Prediction Tools:: Automated ocean model performance analysis tool: Decision Support & Performance Prediction Tools 3							[REDACTED]																	
Decision Support & Performance Prediction Tools:: Navy modular apps for AWIPS: Decision Support & Performance Prediction Tools 4							[REDACTED]																	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603207N / Air/Ocean Tactical Applications	Project (Number/Name) 3405 / Decision Support Products & Dissemination		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>METOC Decision Support Products & Dissemination</i>				
Decision Support & Performance Prediction Tools:: ASW continuous probability of detection algorithm: Decision Support & Performance Prediction Tools 1		1	2018	4
Decision Support & Performance Prediction Tools:: Global ocean model skill competitiveness: Decision Support & Performance Prediction Tools 2		3	2018	1
Decision Support & Performance Prediction Tools:: Automated ocean model performance analysis tool: Decision Support & Performance Prediction Tools 3		2	2018	4
Decision Support & Performance Prediction Tools:: Navy modular apps for AWIPS: Decision Support & Performance Prediction Tools 4		2	2018	4
				2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603216N / Aviation Survivability										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	183.223	14.811	5.566	7.050	-	7.050	7.271	7.408	7.502	7.486	Continuing	Continuing			
0584: Acft Protective Clothing	99.335	2.386	2.534	3.918	-	3.918	4.116	4.188	4.221	4.135	Continuing	Continuing			
0591: Acft Survivability, Vulnerability & Safety	45.261	1.343	1.385	1.502	-	1.502	1.512	1.543	1.572	1.605	Continuing	Continuing			
0592: Acft & Ordnance Safety	35.477	0.907	1.060	1.047	-	1.047	1.045	1.068	1.089	1.112	Continuing	Continuing			
1819: CV Acft Fire Suppress System	3.133	0.504	0.587	0.583	-	0.583	0.598	0.609	0.620	0.634	Continuing	Continuing			
9999: Congressional Adds	0.017	9.671	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.688			
A. Mission Description and Budget Item Justification															
Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall opportunity for aircrew and platform protection and enhanced performance. The capabilities addressed under this program element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios.															
JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.															
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total									
Previous President's Budget		5.239	5.566	5.792	-	-						5.792			
Current President's Budget		14.811	5.566	7.050	-	-						7.050			
Total Adjustments		9.572	0.000	1.258	-	-						1.258			
• Congressional General Reductions		-	-												
• Congressional Directed Reductions		-	-												
• Congressional Rescissions		-	-												
• Congressional Adds		-	-												
• Congressional Directed Transfers		-	-												
• Reprogrammings		-0.007	0.000												
• SBIR/STTR Transfer		-0.420	0.000												
• Program Adjustments		0.000	0.000	1.357	-	-						1.357			
• Rate/Misc Adjustments		-0.001	0.000	-0.099	-	-						-0.099			
• Congressional Add Adjustments		10.000	-	-	-	-						-			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603216N / <i>Aviation Survivability</i>	
Congressional Add Details (\$ in Millions, and Includes General Reductions) Project: 9999: Congressional Adds Congressional Add: <i>Program Increase</i>		FY 2017 FY 2018
		9.671 0.000
	Congressional Add Subtotals for Project: 9999	9.671 0.000
	Congressional Add Totals for all Projects	9.671 0.000
Change Summary Explanation Technical: Not applicable		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 0584 / Acft Protective Clothing			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0584: Acft Protective Clothing	99.335	2.386	2.534	3.918	-	3.918	4.116	4.188	4.221	4.135	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 0584 develops, demonstrates, and validates technologies designed to enhance warfighter performance, protection, mission effectiveness, and survivability. The project addresses life support equipment, advanced helmet vision systems, escape systems technology, crew centered cockpit design, and control stations. Integrate and use alternative and new technologies for the Pilot Vehicle Integration, optimization of Intelligence Surveillance and Reconnaissance (ISR), and Forward Air Control-Air mission areas. Demonstrate innovative tools / approaches to improve situational awareness, new ISR technologies, and Graphical User Interfaces (new symbology and optimized logic for system employment). It responds to a number of operational requirements documents, including OR# 210-05-88 for Chemical and Biological protection, OR# 099-05-087 for Laser Eye Protection, and the joint Air Force/Navy (CAF-208-93) for an Aerospace Control Helmet Mounted Cueing System.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Advanced Technology Crew Station	1.329	1.158	1.491	0.000	1.491
Articles:	-	-	-	-	-

FY 2018 Plans:
 Continue to mature aviation physiologic monitoring, warning system and its integration. Begin development of next generation of high resolution (9 mega pixel) color digital near to mid infra-red sensors and micro displays. Explore alternative Organic Light-Emitting Diode micro display technologies such as Wave Guide, Quantum dot, and flexible displays; and near and short wave infra-red sensor development. Explore technologies to improve aircraft seating and bodymounted equipment to increase mission endurance and enhance crashworthiness. Complete testing, and refinement as necessary, of the seat damper system and active seat cushion.

FY 2019 Base Plans:
 The government will be investigating the military utility of Magnetorheological (MR)-based damping systems. The goal is to investigate the capability of MR based damping systems to withstand harsh environments found onboard military vessels while continuing to perform as designed. Prototypes delivered under this agreement will be subjected to extremely harsh conditions that are more representative of the expected. These tasks are intended to begin the process of determining the robustness of the system under long periods of exposure to

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0584 / Acft Protective Clothing	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
severe environments that exists onboard US Navy helicopters. Prototype goggles using new technology will begin field testing.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 to FY 2019 increase is due to Physiological Episode Protection efforts and Working Capitol Fund (WCF) rate increases.				
Title: Advanced Integrated Life Support System Articles: Investigate active measures of solarization and its effect on the ballistic properties of polycarbonate / other materials. Upgrade laser protection to withstand the impact of ultra-fast (femtosecond) high intensity pulses. Continue to mature on-shore supplier of Dielectric Coatings. Investigate the optimal integration of head borne prototype systems (Helmet Mounted Displays, Enhanced Visual Acuity, Hearing Protection with Active Noise Reduction and talk through capability, Modular Helmet, etc.) for increased functionality and reduced loading on the head and spine. Mature digital human modeling capability for crew accommodation and cockpit integration. Investigate methods to reduce spinal loading during normal and emergency operations, which may include investing in additional crash testing, such as joint H-46 crash tests.				1.057 1.376 2.427 0.000 2.427
FY 2018 Plans: The main emphasis will be on designing and constructing a working high resolution fully digital night vision goggle to be followed fully characterizing the subcomponents.				
FY 2019 Base Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 to FY 2019 increase is due to Physiological Episode Protection efforts and Working Capitol Fund (WCF)rate increases.				
Accomplishments/Planned Programs Subtotals				2.386 2.534 3.918 0.000 3.918

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability						Project (Number/Name) 0584 / Acft Protective Clothing		
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost	
• OPN 4268: Aviation Support Equipment	29.528	63.277	39.374	-	39.374	51.957	55.434	70.046	71.314	Continuing	Continuing	
Remarks												
D. Acquisition Strategy Primary Hardware Development for the Navy Advanced Technology Crew Station efforts will be performed under a Cost Plus Fixed Fee Indefinite Delivery Indefinite Quantity contract.												
E. Performance Metrics Develop advanced crashworthy system level models, investigate improved visual search methodologies, and improve the ability to assess cockpit compatibility through new analytic approaches to anthropometry.												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability					Project (Number/Name) 0584 / Acft Protective Clothing					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Pax River MD	34.037	0.945	Dec 2016	0.550	Dec 2017	0.637	Dec 2018	-		0.637	Continuing	Continuing	Continuing
Primary Hardware Development	C/CPFF	Intevac : San Jose CA	5.118	0.000	Jun 2017	0.489	Jun 2018	1.500	Jun 2019	-		1.500	0.000	7.107	7.107
Primary Hardware Development	MIPR	US Army CERDEC : Ft. Belvoir VA	3.495	0.020	Jun 2017	0.000		0.000		-		0.000	0.000	3.515	3.515
Primary Hardware Development	C/CPFF	Innovital : Calverton MD	0.000	0.145	Dec 2016	0.488	Dec 2017	0.450	Dec 2018	-		0.450	0.000	1.083	1.083
Prior Year Prod Dev no Longer Funded in Budget Year or Outyears	Various	Various : Various	23.340	0.000		0.000		0.000		-		0.000	0.000	23.340	23.340
Systems Engineering	WR	NAWCWD : China Lake CA	0.000	0.040	Aug 2017	0.000		0.000		-		0.000	0.000	0.040	-
Subtotal			65.990	1.150		1.527		2.587		-		2.587	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Configuration Management	WR	NAWCAD : Pax River MD	2.594	0.413	Dec 2016	0.330	Dec 2017	0.490	Dec 2018	-		0.490	Continuing	Continuing	Continuing
Prior Year Support no Longer Funded in Budget Year or Outyears	Various	Various : Various	3.232	0.000		0.000		0.000		-		0.000	0.000	3.232	3.232
Subtotal			5.826	0.413		0.330		0.490		-		0.490	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWCAD : Pax River MD	5.018	0.498	Dec 2016	0.320	Dec 2017	0.551	Dec 2018	-		0.551	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 0584 / Acft Protective Clothing								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Prior Year T&E no Longer Funded in Budget Year or Outyears	Various	Various : Various	18.240	0.000		0.000		0.000		-		0.000	0.000	18.240	18.240	
			Subtotal	23.258	0.498	0.320		0.551		-		0.551	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	WR	NAWCAD : Pax River MD	3.780	0.315	Dec 2016	0.342	Dec 2017	0.275	Dec 2018	-		0.275	Continuing	Continuing	Continuing	
Travel	PO	NAVAIR : Pax River MD	0.471	0.010	Oct 2016	0.015	Oct 2017	0.015	Oct 2018	-		0.015	Continuing	Continuing	Continuing	
Prior Year Mgmt Svcs no Longer Funded in Budget Year or Outyears	Various	Various : Various	0.010	0.000		0.000		0.000		-		0.000	0.000	0.010	0.010	
			Subtotal	4.261	0.325	0.357		0.290		-		0.290	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				99.335	2.386		2.534		3.918		-		3.918	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018							
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)							
1319 / 4				PE 0603216N / Aviation Survivability								0584 / Acft Protective Clothing											
				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acft Protective Clothing																							
Acquisition Milestones: Advanced Integrated Life Support Systems (AILSS)																							
Test & Evaluation Milestones: Advanced Technology Crew Station																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0584 / Acft Protective Clothing		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Acft Protective Clothing				
Acquisition Milestones: Advanced Integrated Life Support Systems (AILSS)		1	2017	4
Test & Evaluation Milestones: Advanced Technology Crew Station		1	2017	4
				2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 0591 / Acft Survivability, Vulnerability & Safety			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0591: Acft Survivability, Vulnerability & Safety	45.261	1.343	1.385	1.502	-	1.502	1.512	1.543	1.572	1.605	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
Aircraft Survivability, Vulnerability and Safety. This project develops prototype hardware to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of fire and explosion suppression techniques for fuel systems.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
<i>Title:</i> Technology Requirements											<i>Articles:</i>	
<i>FY 2018 Plans:</i> Maintain a comprehensive Survivability Master Plan; assess technologies to identify survivability gaps as part of the OPNAV Aircraft Survivability Investment Strategy (OASIS); mature survivability assessment processes; support rotary wing and fixed wing programmatic requirements for survivability studies, assessments, and analyses.											<i>FY 2017</i>	
											<i>FY 2018</i>	
											<i>FY 2019 Base</i>	
											<i>FY 2019 OCO</i>	
											<i>FY 2019 Total</i>	
<i>Title:</i> Technology Design & Development											<i>Articles:</i>	
<i>FY 2019 OCO Plans:</i> N/A											<i>FY 2017</i>	
											<i>FY 2018</i>	
											<i>FY 2019 Base</i>	
											<i>FY 2019 OCO</i>	
											<i>FY 2019 Total</i>	
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Budget increase from FY 2018 to FY 2019 supports additional iASE technical evaluations.												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0591 / Acft Survivability, Vulnerability & Safety
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy Primary Hardware Development will be performed under either a Cost Plus Fixed Fee or a Firm Fixed Price contract.		
E. Performance Metrics Evaluate 100% of deployed/developmental United States Navy/United States Marine Corp aircraft platforms for survivability deficiencies using Navy gap analysis as baseline. Identify prototype hardware solutions to address 25% to 50% of deficiencies, and initiate a minimum of two new demonstration projects per year.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 0591 / Acft Survivability, Vulnerability & Safety							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Pax River, MD	12.856	0.144	Oct 2016	0.130	Oct 2017	0.207	Oct 2018	-		0.207	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCWD : China Lake, CA	0.328	0.025	Oct 2016	0.000		0.030	Oct 2018	-		0.030	0.000	0.383	0.383
Systems Engineering	MIPR	DTIC : Ft. Belvoir, VA	0.520	0.000	Jan 2017	0.193	Jan 2018	0.600	Jan 2019	-		0.600	0.000	1.313	1.313
System Engineering	C/CPFF	Engility : Chantilly, VA	1.472	1.136	Oct 2016	0.975	Oct 2017	0.600	Oct 2018	-		0.600	0.000	4.183	4.183
Prior Year Prod Dev cost no longer funded in FYDP	Various	Various : Various	17.692	0.000		0.000		0.000		-		0.000	0.000	17.692	17.692
Subtotal			32.868	1.305		1.298		1.437		-		1.437	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Support cost no longer funded in FYDP	Various	Various : Various	4.569	0.000		0.000		0.000		-		0.000	0.000	4.569	4.569
Subtotal			4.569	0.000		0.000		0.000		-		0.000	0.000	4.569	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAWCAD : Patuxent River, MD	2.434	0.000	Oct 2016	0.050	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		0.020	Feb 2019	-		0.020	0.000	0.020	0.020
Prior Year T&E cost no longer funded in FYDP	Various	Various : Various	2.995	0.000		0.000		0.000		-		0.000	0.000	2.995	2.995
Subtotal			5.429	0.000		0.050		0.020		-		0.020	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability						Project (Number/Name) 0591 / Acft Survivability, Vulnerability & Safety			
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<u>Remarks</u>															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Pax River, MD	1.680	0.033	Oct 2016	0.032	Oct 2017	0.045	Oct 2018	-		0.045	Continuing	Continuing	Continuing
Travel	PO	NAVAIR : Patuxent River, MD	0.375	0.005	Oct 2016	0.005	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Prior Year Mgmt cost no longer funded in FYDP	Various	Various : Various	0.340	0.000		0.000		0.000		-		0.000	0.000	0.340	0.340
Subtotal			2.395	0.038		0.037		0.045		-		0.045	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			45.261	1.343		1.385		1.502		-		1.502	Continuing	Continuing	N/A
<u>Remarks</u>															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)								
1319 / 4					PE 0603216N / Aviation Survivability					0591 / Acft Survivability, Vulnerability & Safety								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0591 / Acft Survivability, Vulnerability & Safety

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Acft Survivability, Vulnerability & Safe				
Technology Requirements: Survivability Master Plan Update 4	4	2017	4	2017
Technology Requirements: Survivability Master Plan Update 5	4	2019	4	2019
Technology Requirements: Survivability Master Plan Update 6	4	2021	4	2021
Technology Requirements: Survivability Master Plan Update 7	4	2023	4	2023
Technology Requirements: Asymmetric Threat Evaluations	1	2017	4	2023
Technology Design & Development: Rotary Wing Prototype Hardware	1	2017	4	2023
Technology Design & Development: Survivability Improvements	1	2017	4	2023
Technology Test & Evaluation: Rotary Wing Ballistic Testing	1	2017	4	2023
Technology Test & Evaluation: Rotary Wing Signature Tests	1	2017	4	2023
Technology Test & Evaluation: Prototype Hardware Tests	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 0592 / Acft & Ordnance Safety			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0592: Acft & Ordnance Safety	35.477	0.907	1.060	1.047	-	1.047	1.045	1.068	1.089	1.112	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Aircraft and Ordnance Safety Program transitions innovative munitions safety technology to Navy and Marine Corps air weapons, to comply with the Chief of Naval Operations direction that all munitions carried aboard Navy ships be insensitive to unplanned stimuli (thermal, impact, and shock events). The Aircraft and Ordnance Safety Program also ensures the safety and protection of personnel, aircraft, ships, and operational facilities, through improved precision targeting, fail-safe ordnance, selective effects munitions and shock/blast force protection technologies.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Insensitive Munitions (IM) Articles:	0.907	1.060	1.047	0.000	1.047
FY 2018 Plans: Improve Air-to-Air Demonstration: Continue Sidewinder warhead technology risk reduction evaluation in support of PMA-259 planned block II+ or III transition with digital detonation initiator, improved multi-layered case warhead design. Continue Sidewinder rocket motor technology risk reduction evaluation in support of PMA-259 planned block III transition with highly-loaded-grain, high-performance motor, and radio frequency cook-off sensor. Evaluation of Metal Matrix Composite structures was completed in FY 17. Improve Air-Launched Weapons: Continue Insensitive Munitions (IM) and performance evaluation of a cast/cure minimum smoke composite propellant that will meet -65 degree requirement for fixed-wing platforms. Testing will be done in a Hellfire configuration to demonstrate transition ability to a system with equivalent requirements in support of PMA 242 tier III requirements. Continue evaluation of Highly-loaded-grain high performance rocket motor and application of Slow-cook-off-sensor technology in Advanced Anti-Radiation Guided Missile (AARGM) configuration for transition to PMA 242 AARGM BLKII upgrade. Advanced Containment/Case/Warhead Materials: Demonstrate IM performance of the Joint Multiple Effects Warhead System in the new revised configuration for transition to PMA 280 FY 19 planned warhead upgrade. Initiate IM and Operational performance evaluation of Eutectic Metal Composite (EMC) for Rocket Motor and Warhead components. EMC technology provides improved material strength properties and the ability to produce structures with advanced configurations that would potentially enhance both IM and operational performance.	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0592 / Acft & Ordnance Safety				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Shock/Blast Barrier Protection Modeling, Demonstration, and Testing: Continue tech-watch investigation for effective, affordable blast barrier and impact mitigation for application to Tomahawk weapon.						
Advanced Energetic Materials: Initiate evaluation of a JIMTP transition new explosive fill for BLU 111 to address Navy unique issues (i.e., irreversible growth, explosive train reliability for a very insensitive main fill, and thermal environments and ullage requirements for the fill to ensure improved IM demonstrated in JIMTP.						
FY 2019 Base Plans: Air-to-Air Demonstration: Continue Sidewinder warhead technology risk reduction evaluation in support of PMA-259 planned block II+ or III transition with digital detonation initiator, improved multi-layered case warhead design. Continue Sidewinder rocket motor technology risk reduction evaluation in support of PMA-259 planned block III transition with highly-loaded-grain, high-performance motor, and radio frequency cook-off sensor. Evaluation of Metal Matrix Composite structures for use with Min-Smoke propellants for use in HELLCIRE.						
Improve Air-Launched Weapons: Continue Inert Munitions (IM) and performance evaluation of a cast/cure minimum smoke composite propellant that will meet -65 degree requirement for fixed-wing platforms. Testing will be done in a Hellfire configuration to demonstrate transition ability to a system with equivalent requirements in support of PMA 242 tier III requirements. Continue evaluation of Highly-loaded-grain high performance rocket motor and application of Slow-cook-off-sensor technology in Advanced Anti-Radiation Guided Missile (AARGM) configuration for transition to PMA 242 AARGM BLK II upgrade.						
Advanced Containment/Case/Warhead Materials: Demonstrate IM performance of the Joint Multiple Effects Warhead System in the new revised configuration for transition to PMA 280 FY 19 planned warhead upgrade. Initiate IM and Operational performance evaluation of Eutectic Metal Composite (EMC) for Rocket Motor and Warhead components. EMC technology provides improved material strength properties and the ability to produce structures with advanced configurations that would potentially enhance both IM and operational performance.						
Shock/Blast Barrier Protection Modeling, Demonstration, and Testing: Continue tech-watch investigation for effective, affordable blast barrier and impact mitigation for application to Tomahawk weapon.						
Advanced Energetic Materials: Continue evaluation of a Joint Service Inert Munitions Technology Program (JIMTP) transition new explosive fill for Bomb Live Unit 111 to address Navy unique issues (i.e.,						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0592 / Acft & Ordnance Safety				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
irreversible growth, explosive train reliability for a very insensitive main fill, and thermal environments and ullage requirements for the fill to ensure improved IM demonstrated in JIMTP).						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.						
Accomplishments/Planned Programs Subtotals		0.907	1.060	1.047	0.000	1.047
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
All planned programs are accomplished via civilian labor and use of government testing facilities.						
E. Performance Metrics						
The Aircraft and Ordnance Safety program will initiate six to nine technology development/maturation efforts to improve IM signature and will work to transition those technologies to weapons programs. The weapons programs will be chosen based on PEO(U&W) weapons portfolio and will focus on the priority weapons as defined in the IM strategic plan.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability						Project (Number/Name) 0592 / Acft & Ordnance Safety			
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCWD : China Lake, CA	35.469	0.907	Oct 2016	1.060	Oct 2017	1.047	Oct 2018	-		1.047	Continuing	Continuing	Continuing
Subtotal			35.469	0.907		1.060		1.047		-		1.047	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Mgmt no longer funded in FYDP	Various	Various : Various	0.008	0.000		0.000		0.000		-		0.000	0.000	0.008	0.008
Subtotal			0.008	0.000		0.000		0.000		-		0.000	0.000	0.008	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			35.477	0.907		1.060		1.047		-		1.047	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity
1319 / 4**R-1 Program Element (Number/Name)**
PE 0603216N / Aviation Survivability**Project (Number/Name)**
0592 / Acft & Ordnance Safety**Acft & Ordnance Safety**

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1Q	2Q	3Q	4Q																									
Air-to-Air Missile Demonstration/Testing																													
Improved Air-Launched Weapons																													
Advanced Containment/Case/Warhead Materials																													
Shock/Blast Barrier Protection Modeling Demonstration/Testing																													
Advanced Energetic Materials																													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 0592 / Acft & Ordnance Safety		
Schedule Details				
Events by Sub Project		Start	End	
<i>Acft & Ordnance Safety</i>				
Air-to-Air Missile Demonstration/Testing		1	2017	4
Improved Air-Launched Weapons		1	2017	4
Advanced Containment/Case/Warhead Materials		1	2017	4
Shock/Blast Barrier Protection Modeling Demonstration/Testing		1	2017	4
Advanced Energetic Materials		1	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 1819 / CV Acft Fire Suppress System				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
1819: CV Acft Fire Suppress System	3.133	0.504	0.587	0.583	-	0.583	0.598	0.609	0.620	0.634	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This project develops improved fire-fighting systems and fire protective measures for aircraft-related fires on aircraft carriers, including assessment of fire properties, definition of fire threats, improvements to fire-fighting agents and delivery systems, fire detection and suppression system performance evaluations, and fire-fighter training improvements.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Fire-Fighting Articles:	0.504	0.587	0.583	0.000	0.583
FY 2018 Plans: Continue support for Naval Air Training and Operating Procedures Standardization improvements, and modeling and simulation for fire prediction. Continue monitoring aqueous film forming foam developments and other clean agents. Continue project looking at firefighter issues related to unmanned air vehicle systems including composites, weapons and fuels. Evaluate training and certification requirements and equipment to bring the ship up to aviation boatswains mate capabilities and readiness for Auxiliary Crane Support ships that rely on the ships damage control team and limited resources. Continue to evaluate equipment improvements for saws, spreaders, and other improvements to reduce or discontinue the use of Motor Gasoline on ships. Finalize evaluations for flash-hood, crash-fire-rescue face shield and firefighter personnel floatation device improvements. Continue to monitor and recommend Electromagnetic Aircraft Launch Systems fire doctrine, Carrier Fixed Wing Aircraft Nuclear hangar bay conflagration management system operations, and unmanned carrier launched airborne surveillance and strike firefighting operations impacts. Develop procedures to be used aboard ship to rapidly and safely extinguished deep seated smoldering fires with composite materials.	-	-	-	-	
FY 2019 Base Plans: Continue support for Naval Air Training and Operating Procedures Standardization improvements, and modeling and simulation for fire prediction. Continue monitoring aqueous film forming foam developments and other clean agents. Continue to monitor new equipment improvements for saws, spreaders, and other improvements to reduce or discontinue the use of Motor Gasoline on ships. Finalize evaluations for flash-hood, crash-fire-rescue face shield and firefighter personnel floatation device improvements. Continue to monitor and recommend Electromagnetic Aircraft Launch Systems fire doctrine, Carrier Fixed Wing Aircraft Nuclear					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 1819 / CV Acft Fire Suppress System				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
hangar bay conflagration management system operations, and unmanned carrier launched airborne surveillance and strike firefighting operations impacts. Finalize project looking at firefighter issues related to composites, weapons and fuels and develop procedures to be used aboard ship to rapidly and safely extinguished deep seated smoldering fires with composite materials. Continue to evaluate training and certification requirements and equipment to bring the ship up to aviation boatswains mate capabilities and readiness for Air Capable Ships, ships that rely on the ships damage control team and limited resources. Continue improved weapons cooling scenario testing. Begin project looking at options for firefighter equipment storage on CVN's and LHA/D ships.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.						
Accomplishments/Planned Programs Subtotals		0.504	0.587	0.583	0.000	0.583
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
This is a non-ACAT program. Procurement strategy is determined by market survey and cooperative opportunities.						
E. Performance Metrics						
The Carrier Aircraft Fire Suppression (CAFS) program will, at a minimum, fund six to ten projects per year that investigate and evaluate tactical capability gaps and potential capability improvements regarding shipboard aircraft fire suppression doctrine and equipment. CAFS projects will have a greater than 90% success rate of insertion into Department of the Navy shipboard aircraft fire-fighting procedures and documentation.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability					Project (Number/Name) 1819 / CV Acft Fire Suppress System					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	ICL : Virginia Beach, VA	0.020	0.000		0.000		0.000		-		0.000	0.000	0.020	0.020
Systems Engineering	WR	NAWCWD : China Lake, CA	0.027	0.087	Oct 2016	0.085	Oct 2017	0.042	Oct 2018	-		0.042	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	Hughes Associates : Baltimore, MD	0.027	0.005	Nov 2016	0.025	Nov 2017	0.000		-		0.000	0.000	0.057	0.057
Systems Engineering	C/CPFF	AVW : Chesapeake, VA	0.013	0.000		0.000		0.015	Nov 2018	-		0.015	0.000	0.028	0.028
Prior Yr Prod Dev no longer funded in the FYDP	Various	Various : Various	0.220	0.000		0.000		0.000		-		0.000	0.000	0.220	0.220
Systems Engineering	WR	NRL : Washington, DC	0.006	0.001	May 2017	0.018	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.313	0.093		0.128		0.057		-		0.057	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	C/CPFF	ICL : Virginia Beach, VA	0.105	0.000		0.000		0.027	Nov 2018	-		0.027	0.000	0.132	0.132
Engineering Support	WR	NAWCWD : China Lake, CA	0.223	0.134	Oct 2016	0.100	Oct 2017	0.150	Oct 2018	-		0.150	Continuing	Continuing	Continuing
Engineering Support	C/CPFF	Hughes Associates : Baltimore, MD	0.027	0.020	Nov 2016	0.050	Nov 2017	0.035	Nov 2018	-		0.035	0.000	0.132	0.132
Engineering Support	C/CPFF	AVW : Chesapeake, VA	0.074	0.040	Nov 2016	0.035	Nov 2017	0.035	Nov 2018	-		0.035	0.000	0.184	0.184
Engineering Support	WR	NRL : Washington, DC	0.000	0.001	May 2017	0.018	May 2018	0.005	May 2019	-		0.005	Continuing	Continuing	Continuing
Subtotal			0.429	0.195		0.203		0.252		-		0.252	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 1819 / CV Acft Fire Suppress System						
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Test & Evaluation	WR	NAWCWD : China Lake, CA	1.392	0.044	Oct 2016	0.150	Oct 2017	0.167	Oct 2018	-		0.167	Continuing	Continuing	Continuing
Technology Test & Evaluation	C/FFP	Hughes Associates : Baltimore, MD	0.538	0.015	Nov 2016	0.025	Nov 2017	0.050	Nov 2018	-		0.050	0.000	0.628	0.628
Technology Test & Evaluation	C/CPFF	AVW : Chesapeake, VA	0.012	0.010	Nov 2016	0.015	Nov 2017	0.000		-		0.000	0.000	0.037	0.037
Prior yr T&E no longer funded in the FYDP	Various	Various : Various	0.292	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			2.234	0.069		0.190		0.217		-		0.217	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	WR	NAWCWD : China Lake, CA	0.157	0.147	Oct 2016	0.066	Oct 2017	0.057	Oct 2018	-		0.057	Continuing	Continuing	Continuing
Subtotal			0.157	0.147		0.066		0.057		-		0.057	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			3.133	0.504		0.587		0.583		-		0.583	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018	
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)	
1319 / 4								PE 0603216N / Aviation Survivability								1819 / CV Acft Fire Suppress System	
FY 2017 FY 2018 FY 2019 FY 2020 FY 2021 FY 2022 FY 2023																	
Proj 1819		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CV Acft Fire Suppression Systems: Fire Fighting		[REDACTED]															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 1819 / CV Acft Fire Suppress System	
Schedule Details			
Events by Sub Project	Start	End	
Proj 1819	Quarter	Year	Quarter
CV Acft Fire Suppression Systems: Fire Fighting	1	2017	4
			2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability				Project (Number/Name) 9999 / Congressional Adds			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
9999: Congressional Adds	0.017	9.671	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.688
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

Note

Internal realignment being done to move this funding to the correct PE 0603261N.

A. Mission Description and Budget Item Justification

Congressional add. Funds are aligned to the Tactical Airborne Reconnaissance for enhanced mission intelligence, surveillance, and reconnaissance performance.

B. Accomplishments/Planned Programs (\$ in Millions)

Congressional Add: Program Increase

FY 2017 Accomplishments: Congressional add. Funds are aligned to the Tactical Airborne Reconnaissance for enhanced mission intelligence, surveillance, and reconnaissance performance.

FY 2018 Plans: N/A

FY 2017	FY 2018
9.671	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks**D. Acquisition Strategy**

N/A

E. Performance Metrics

Congressional add to be determined.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability					Project (Number/Name) 9999 / Congressional Adds						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Systems Engineering	Various	TBD : TBD	0.017	9.671	Sep 2017	0.000		0.000		-		0.000	0.000	9.688	-	
		Subtotal	0.017	9.671		0.000		0.000		-		0.000	0.000	9.688	N/A	
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Engineering	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-	
		Subtotal	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-	
		Subtotal	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.017	9.671		0.000		0.000		-		0.000	0.000	9.688	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018							
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)							
1319 / 4				PE 0603216N / Aviation Survivability								9999 / Congressional Adds											
				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 9999																							
Unmanned Systems Integration to National Airspace System: Congressional Add																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603216N / Aviation Survivability	Project (Number/Name) 9999 / Congressional Adds	
Schedule Details			
Events by Sub Project		Start	End
<i>Proj 9999</i>		Quarter	Year
Unmanned Systems Integration to National Airspace System: Congressional Add		4	2017
		2	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)												
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603251N / (U)AIRCRAFT SYSTEMS												
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost					
Total Program Element	18.988	1.519	0.695	0.793	-	0.793	1.508	1.522	1.549	1.581	Continuing	Continuing					
3331: C-2 System Development	18.988	1.519	0.695	0.793	-	0.793	1.508	1.522	1.549	1.581	Continuing	Continuing					
A. Mission Description and Budget Item Justification																	
This program element supports the study, evaluation, optimization and enhancements of fielded aircraft systems not supported by a system specific Research, Development, Test and Evaluation, Navy program element. The supported efforts will provide a basis to recommend options for improved efficiency, minimization of life cycle cost, and other affordable options. As naval aircraft systems age, and analysis of the programmatic and /or reliability enhancements options allows the Department of the Navy to more effectively understand and manage system lifecycle costs and implications in future airborne platforms.																	
This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.																	
B. Program Change Summary (\$ in Millions)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total										
Previous President's Budget			1.519	0.695	0.815	-	0.815										
Current President's Budget			1.519	0.695	0.793	-	0.793										
Total Adjustments			0.000	0.000	-0.022	-	-0.022										
• Congressional General Reductions			-	-													
• Congressional Directed Reductions			-	-													
• Congressional Rescissions			-	-													
• Congressional Adds			-	-													
• Congressional Directed Transfers			-	-													
• Reprogrammings			-	-													
• SBIR/STTR Transfer			-	-													
• Rate/Misc Adjustments			0.000	0.000	-0.022	-	-0.022										
Change Summary Explanation																	
Technical: Not applicable.																	
Schedule: Not applicable.																	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603251N I (U)AIRCRAFT SYSTEMS				Project (Number/Name) 3331 I C-2 System Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3331: C-2 System Development	18.988	1.519	0.695	0.793	-	0.793	1.508	1.522	1.549	1.581	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The C-2A Greyhound is a high wing monoplane, twin engine turbo-prop aircraft capable of operating from both a shore base and all operational United States Navy aircraft carrier classes. The mission of the C-2A is to provide rapid response Carrier Onboard Delivery of fleet essential supplies, repair parts, and personnel to sustain at sea operations of deployed battle groups. In addition, the C-2A provides airdrop delivery and mobilization support for special operations forces from land bases and carriers, Search and Rescue, and Humanitarian Relief.

This project will fund required development, analysis, and testing of ARC-210 upgrade and other subsystems required to operate the C-2A to the end of its service life.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Combat Readiness	1.519	0.695	0.793	0.000	0.793
Articles:	-	-	-	-	-
Description: C-2 Combat Readiness establishes an enduring capacity to address obsolescence, safety, and readiness degrader issues for the C-2A(R) aircraft until the end of it's service life.					
FY 2018 Plans: Continuation of C-2A subsystems studies and analysis.					
FY 2019 Base Plans: Continuation of C-2A subsystems studies and analysis.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: FY19 funding increased of \$0.098 based on original program plan.					
Accomplishments/Planned Programs Subtotals					1.519 0.695 0.793 0.000 0.793

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APN/0556: C-2A Series	18.971	18.673	10.327	-	10.327	20.826	17.538	0.000	0.000	8.399	558.965

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603251N / (U)AIRCRAFT SYSTEMS				Project (Number/Name) 3331 / C-2 System Development		
C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete
Remarks										
D. Acquisition Strategy The C-2 Operational Ground Controllability strategy will be exercised under an Engineering Change Proposal.										
E. Performance Metrics Test and Evaluation 3Q FY17. C-2A Hydraulic Systems studies and analysis final report 4Q FY17.										

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603251N / (U)AIRCRAFT SYSTEMS					Project (Number/Name) 3331 / C-2 System Development					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPFF	NGC : Bethpage, NY	10.370	0.000		0.000		0.000		-		0.000	0.000	10.370	10.370
Primary Hardware Development	SS/FPP	Rockwell Collins Inc. : Cedar Rapids, IA	0.156	0.000		0.000		0.000		-		0.000	0.000	0.156	0.156
System Engineering	SS/CPFF	NGC : Melbourne, FL	0.603	0.000		0.000		0.000		-		0.000	0.000	0.603	0.603
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	0.022	0.000		0.000		0.000		-		0.000	0.000	0.022	0.022
Subtotal			11.151	0.000		0.000		0.000		-		0.000	0.000	11.151	N/A

Remarks															
Totals may not add due to rounding.															

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWCAD : Pax River, MD	4.143	0.000		0.000		0.000		-		0.000	0.000	4.143	-
Government Engineering Support	WR	North Island : North Island, CA	1.285	0.000		0.000		0.000		-		0.000	0.000	1.285	-
Development Support	WR	North Island : North Island, CA	0.440	0.409	Dec 2016	0.685	Nov 2017	0.793	Nov 2018	-		0.793	Continuing	Continuing	Continuing
ILS Support	WR	North Island : North Island, CA	0.045	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Prior year Support no longer funded in the FYDP	Various	Various : Various	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
Subtotal			6.013	0.409		0.685		0.793		-		0.793	Continuing	Continuing	N/A

Remarks															
Totals may not add due to rounding.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603251N / (U)AIRCRAFT SYSTEMS					Project (Number/Name) 3331 / C-2 System Development						
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation	WR	NAWCAD : Pax River, MD	1.808	1.100	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
			Subtotal	1.808	1.100		0.000		0.000		-		0.000	Continuing	Continuing	N/A
Remarks																
Totals may not add due to rounding.																
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Travel	Various	Various : Various	0.016	0.010	Oct 2016	0.010	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing	
			Subtotal	0.016	0.010		0.010		0.000		-		0.000	Continuing	Continuing	N/A
Remarks																
Totals may not add due to rounding.																
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				18.988	1.519		0.695		0.793		-		0.793	Continuing	Continuing	N/A
Remarks																
Totals may not add due to rounding.																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603251N / (U)AIRCRAFT SYSTEMS

Project (Number/Name)

3331 / C-2 System Development

Combat Readiness	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
Systems Development																															
Development Support	Development and Design																														
Test & Evaluation					Developmental Test																										
Technical Evaluation																															

2019PB - 0603251N - 3331

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603251N / (U)AIRCRAFT SYSTEMS	Project (Number/Name) 3331 / C-2 System Development		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
Combat Readiness				
Systems Development: Development Support: Development Support		1	2017	3
Systems Development: Development Support: Studies		1	2017	4
Test & Evaluation: Technical Evaluation: Developmental Test		3	2017	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603254N / ASW Systems Development								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	121.895	6.877	7.661	7.058	-	7.058	7.184	7.336	7.478	7.630	Continuing	Continuing	
1292: Adv ASW Sensors & Proc	121.895	6.877	7.661	7.058	-	7.058	7.184	7.336	7.478	7.630	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
Includes RDT&E funds for advanced development and developmental testing of airborne anti-submarine warfare (ASW) systems, including aircraft, equipment, and devices for use against all types of submarine targets.													
JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				7.041	7.661	7.189	-	-	7.189				
Current President's Budget				6.877	7.661	7.058	-	-	7.058				
Total Adjustments				-0.164	0.000	-0.131	-	-	-0.131				
• Congressional General Reductions				-	-	-	-	-					
• Congressional Directed Reductions				-	-	-	-	-					
• Congressional Rescissions				-	-	-	-	-					
• Congressional Adds				-	-	-	-	-					
• Congressional Directed Transfers				-	-	-	-	-					
• Reprogrammings				-0.003	0.000	-	-	-					
• SBIR/STTR Transfer				-0.144	0.000	-	-	-					
• Rate/Misc Adjustments				0.000	0.000	-0.131	-	-	-0.131				
• Congressional General Reductions				-0.017	-	-	-	-					
Adjustments				-	-	-	-	-					
Change Summary Explanation													
Technical: Not applicable.													
Schedule:													
1292. Not applicable.													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603254N / ASW Systems Development				Project (Number/Name) 1292 / Adv ASW Sensors & Proc				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
1292: Adv ASW Sensors & Proc	121.895	6.877	7.661	7.058	-	7.058	7.184	7.336	7.478	7.630	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This program provides Air Anti-Submarine Warfare (ASW) effectiveness through development and maturation of advanced hardware and software associated with airborne acoustic and non-acoustic systems. This includes sensors and components, processing, post-processing, data recording and display capabilities to address regional threat scenarios against surfaced or submerged conventionally and nuclear powered submarines. Key objectives are platform accommodations of advanced active and passive sensors and components, improved detection, classification, localization, tracking, and increased capacity and flexibility to handle multi-sensor data loads. Furthermore, technologies that can be affordably implemented as payloads across fixed wing, rotary and unmanned platforms engaged in ASW, will be pursued. Programs being funded during the FYDP will evaluate technologies such as: Over the Horizon (OTH) communications, sonobuoy communication link to/from aircraft, Distributed Netted Sensors, transient signals, and source and receiver improvement technologies that will enhance passive and multi-static active sensor systems capabilities. Programs being funded during the FYDP will provide for the development and maturation of persistent tactical search technologies that will allow transition to the localization and attack phase in all operationally relevant environments. In addition, the program will provide for the development and subsequent experimentation, including data collection and engineering measurement, of Multi-static Active Coherent sources and receivers, laser technologies, electro-optical and multi-spectral camera technologies, radar, and Magnetic Anomaly Detection (MAD) sensors. Those technologies that are deemed mature and provide increased operational capability will be approved for a production Rapid Capability Insertion (RCI) build. The test articles, which consist of passive/active sensors/components and associated processors, will support at-sea trials and experiments.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: System performance assessments	6.877	7.661	7.058	0.000	7.058
Articles:	100	100	-	-	-

FY 2018 Plans:
Conduct sensor and system performance assessments and effects chains gap analyses on the next generation of Multi-Static Active Coherent system components, advancements in passive sensing and other acoustic and non-acoustic enhancements for traditional and high altitude ASW operations. The related test articles, consisting of passive/active sensors/components, models, processors and algorithms, will support execution of at-sea demonstrations and experimentation. Develop and mature prototype software for participation in at-sea experimentation and data collection. Conduct data analyses and evaluate/mature signal processing algorithms with science and technology research and development, and operational fleet-collected data.

FY 2019 Base Plans:
Conduct sensor and system performance assessments and effects chains gap analyses on the next generation of Multi-Static Active Coherent system components, advancements in passive sensing and other acoustic and

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018																									
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603254N / ASW Systems Development				Project (Number/Name) 1292 / Adv ASW Sensors & Proc																											
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018																								
non-acoustic enhancements for traditional and high altitude ASW operations. Develop and mature prototype signal processing and hardware for data collections and at-sea experimentation. Employ the related test articles, models, processors and algorithms in at-sea demonstrations and related laboratory or in-water experiments to validate technical maturity and operational performance. Conduct data analyses to evaluate and mature the prototype hardware and signal processing algorithms leveraging science and technology, research and development, and operational fleet-collected data.										FY 2019 Base	FY 2019 OCO																								
FY 2019 OCO Plans: N/A										FY 2019 Total																									
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to Navy-wide efficiencies and rate adjustments.																																			
Accomplishments/Planned Programs Subtotals										6.877	7.661																								
C. Other Program Funding Summary (\$ in Millions)										7.058	0.000																								
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 25%;">Line Item</th> <th style="text-align: center; width: 15%;">FY 2017</th> <th style="text-align: center; width: 15%;">FY 2018</th> <th style="text-align: center; width: 15%;">FY 2019 Base</th> <th style="text-align: center; width: 15%;">FY 2019 OCO</th> <th style="text-align: center; width: 15%;">FY 2019 Total</th> <th style="text-align: center; width: 15%;">FY 2020</th> <th style="text-align: center; width: 15%;">FY 2021</th> <th style="text-align: center; width: 15%;">FY 2022</th> <th style="text-align: center; width: 15%;">FY 2023</th> <th style="text-align: center; width: 15%;">Cost To Complete</th> <th style="text-align: center; width: 15%;">Total Cost</th> </tr> </thead> <tbody> <tr> <td>• RDT&E/0480: ASW Sensors & Proc</td> <td style="text-align: center;">24.544</td> <td style="text-align: center;">33.423</td> <td style="text-align: center;">39.020</td> <td style="text-align: center;">-</td> <td style="text-align: center;">39.020</td> <td style="text-align: center;">43.528</td> <td style="text-align: center;">44.448</td> <td style="text-align: center;">45.330</td> <td style="text-align: center;">46.236</td> <td style="text-align: center;">Continuing</td> <td style="text-align: center;">Continuing</td> </tr> </tbody> </table>												Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	• RDT&E/0480: ASW Sensors & Proc	24.544	33.423	39.020	-	39.020	43.528	44.448	45.330	46.236	Continuing	Continuing
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost																								
• RDT&E/0480: ASW Sensors & Proc	24.544	33.423	39.020	-	39.020	43.528	44.448	45.330	46.236	Continuing	Continuing																								
Remarks																																			
D. Acquisition Strategy																																			
Develop and mature promising acoustic and non-acoustic ASW technologies that have high potential for meeting documented capability gaps and Fleet requirements. As funding permits, transition those technologies into acquisition programs of record for eventual Fleet release on ASW platforms.																																			
E. Performance Metrics																																			
Potential ASW technologies are quantitatively assessed for effect on ASW kill chain in relation to cost, schedule and performance metrics.																																			

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603254N / ASW Systems Development				Project (Number/Name) 1292 / Adv ASW Sensors & Proc							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hdw Development	Various	Various : Various	2.337	0.693	Dec 2016	1.500	Dec 2017	1.134	Dec 2018	-		1.134	Continuing	Continuing	Continuing
		Subtotal	2.337	0.693		1.500		1.134		-		1.134	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NAWCAD : PATUXENT RIVER, MD	4.225	1.000	Dec 2016	1.082	Dec 2017	1.050	Dec 2018	-		1.050	0.000	7.357	-
Studies & Analysis	WR	NAWCAD : PATUXENT RIVER, MD	6.681	1.190	Dec 2016	1.000	Dec 2017	1.100	Dec 2018	-		1.100	Continuing	Continuing	Continuing
		Subtotal	10.906	2.190		2.082		2.150		-		2.150	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Dev Test & Eval	Various	Various : Various	21.947	1.900	Dec 2016	1.933	Dec 2017	2.000	Dec 2018	-		2.000	Continuing	Continuing	Continuing
		Subtotal	21.947	1.900		1.933		2.000		-		2.000	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Eng Spt	Various	Various : Various	20.472	1.000	Dec 2016	1.011	Dec 2017	1.000	Dec 2018	-		1.000	Continuing	Continuing	Continuing
ENG & TECH SVCS (NON-FFRDC)	Various	Various : Various	2.894	0.100	Dec 2016	0.100	Dec 2017	0.100	Dec 2018	-		0.100	Continuing	Continuing	Continuing
MGT & PROF SVCS (FFRDC)	Various	Various : Various	1.373	0.100	Dec 2016	0.100	Dec 2017	0.100	Dec 2018	-		0.100	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603254N / ASW Systems Development				Project (Number/Name) 1292 / Adv ASW Sensors & Proc							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Eng Spt	WR	NAWCAD : PATUXENT RIVER, MD	61.818	0.886	Dec 2016	0.927	Dec 2017	0.566	Dec 2018	-		0.566	Continuing	Continuing	Continuing	
Travel	Various	VARIOUS : VARIOUS	0.148	0.008	Dec 2016	0.008	Dec 2017	0.008	Dec 2018	-		0.008	Continuing	Continuing	Continuing	
Subtotal			86.705	2.094		2.146		1.774		-		1.774	Continuing	Continuing	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals			121.895	6.877		7.661		7.058		-		7.058	Continuing	Continuing	N/A	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603254N / ASW Systems Development

Project (Number/Name)

1292 / Adv ASW Sensors & Proc

Proj: 1292 - Adv ASW Sensors & Processors

FY 2017

FY 2018

FY 2019

FY 2020

FY 2021

FY 2022

FY 2023

1Q

2Q

3Q

4Q

Performance Assessment

Data Analysis/Engineering Measurement

In-Buoy Processing

OTH Comms

NGAPS

Adv ASW sensing

Transition Decision

In-Buoy
Processing
◆

OTH
Comms
◆

Software

Software Development

Experiment/Exercise Participation

Experiment/Exercise Participation

Trade Studies

Study & Analyze concept options and develop early prototypes

Deliveries

Test Articles

100

100

100

100

100

100

100

100

100

2019PB - 0603254N - 1292

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603254N / ASW Systems Development	Project (Number/Name) 1292 / Adv ASW Sensors & Proc		
Schedule Details				
Events by Sub Project		Start	End	
Proj: 1292 - Adv ASW Sensors & Processors				
Performance Assessment: Data Analysis/Engineering Measurement	1	2017	4	2023
Performance Assessment: In-Buoy Processing	1	2017	4	2018
Performance Assessment: OTH Comms	1	2019	4	2020
Performance Assessment: Next Generation Airborne Passive System	1	2020	4	2023
Performance Assessment: Advanced ASW sensing	1	2022	4	2023
Transition Decision: In-Buoy Processing	4	2018	4	2018
Transition Decision: OTH Comms	4	2020	4	2020
Software: Software Development	1	2017	4	2023
Experiment/Exercise Participation: Experiment/Exercise Participation	1	2017	4	2023
Trade Studies: Trade Studies	1	2017	4	2023
Deliveries: Test Articles: Test Article Deliveries (6)	1	2017	1	2017
Deliveries: Test Articles: Test Article Deliveries (7)	1	2018	1	2018
Deliveries: Test Articles: Test Article Deliveries (8)	1	2019	1	2019
Deliveries: Test Articles: Test Article Deliveries (9)	1	2020	1	2020
Deliveries: Test Articles: Test Article Deliveries (10)	1	2021	1	2021
Deliveries: Test Articles: Test Article Deliveries (11)	1	2022	1	2022
Deliveries: Test Articles: Test Article Deliveries (12)	1	2023	1	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603261N / Tactical Airborne Reconnaissance										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	72.951	3.265	3.707	3.540	-	3.540	3.522	3.593	3.662	3.735	Continuing	Continuing			
2467: UxS Common Standards, Interoperability and Integration	72.951	3.265	3.707	3.540	-	3.540	3.522	3.593	3.662	3.735	Continuing	Continuing			
A. Mission Description and Budget Item Justification															
This program element funds efforts to develop common technical and interoperability standards for current and future unmanned sensors, communications, and networking capabilities to achieve the required integration and interoperability of Unmanned Systems(UxS)represented in approved Naval Concept of Operations (CONOPS).															
This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.															
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
Previous President's Budget				3.274	3.707	3.635	-	3.635							
Current President's Budget				3.265	3.707	3.540	-	3.540							
Total Adjustments				-0.009	0.000	-0.095	-	-0.095							
• Congressional General Reductions				-	-	-									
• Congressional Directed Reductions				-	-	-									
• Congressional Rescissions				-	-	-									
• Congressional Adds				-	-	-									
• Congressional Directed Transfers				-	-	-									
• Reprogrammings				-	-	-									
• SBIR/STTR Transfer				-0.003	0.000	-									
• Rate/Misc Adjustments				0.000	0.000	-0.095									
• Congressional General Reductions				-0.006	-	-									
• Adjustments				-	-	-									
Change Summary Explanation															
Technical: Not applicable to baseline.															
Schedule: Not applicable.															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)						
1319 / 4					PE 0603261N / <i>Tactical Airborne Reconnaissance</i>				2467 / <i>UxS Common Standards, Interoperability and Integration</i>						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
2467: <i>UxS Common Standards, Interoperability and Integration</i>	72.951	3.265	3.707	3.540	-	3.540	3.522	3.593	3.662	3.735	Continuing	Continuing			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-					
A. Mission Description and Budget Item Justification															
The Naval Unmanned Aircraft Systems (UAS) strategy employs a family of UAS to perform persistent Intelligence, Surveillance, and Reconnaissance (ISR) in support of naval and joint service missions from forward bases/platforms and naval ships.															
In support of the Navy and Marine Corps' overall UAS strategy, this program develops common technical and interoperability standards for current and future unmanned sensors, communications, and networking capabilities to achieve the integration and interoperability of UAS systems represented in approved Naval Concept of Operations (CONOPS). Leveraging fleet input based on current operations and informed by future operational plans, these efforts ensure the desired interoperability and integration of Unmanned Systems (UxS) throughout the battlespace is achieved. This program also establishes the common architecture, including command & control, for all unmanned systems to support and inform future CONOPS development. This effort provides for a cross program view of naval unmanned systems and is the entry point for DoN and other services to address commonality and interoperability opportunities.															
Specifically:															
<ul style="list-style-type: none"> - Provides studies and demonstrations in support of naval UAS Family of Systems (FoS) CONOPS development. - Horizontally integrates across the naval UAS FoS through the development of Naval Interoperability Profiles to achieve required unmanned capabilities and interoperability. - Provides support for development of common and interoperable UAS standards for use throughout the Department of Defense (DoD) and the North Atlantic Treaty Organization (NATO). - Conducts CONOPS studies, demonstrations, advanced development/prototyping, and exercises for vehicle control, targeting, and weapons, sensor and payload employment. 															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Studies and Demonstrations Articles: <i>Studies and Demonstrations</i> Description: Studies and demonstrations to support CONOPS development from an interoperability perspective for effective integration of UAS. Develop a UAS architecture environment to allow for effective modeling and simulation of common UAS components in representative battlespace architectures.											1.656	1.760	1.920	0.000	1.920
											-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603261N / <i>Tactical Airborne Reconnaissance</i>	Project (Number/Name) 2467 / <i>UxS Common Standards, Interoperability and Integration</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Continue development of the UAS technical standards to include associated modeling and simulation across Fleet CONOPS scenarios. Demonstrate and validate manned/unmanned interoperability. Provide government engineering support, program office travel, and contract support services.						
FY 2019 Base Plans: Continue development of the Unmanned Aircraft Systems (UAS) modeling and simulation of Fleet CONOPS scenarios. Demonstrate Manned/Unmanned Interoperability. Provide government engineering support, program office travel, and contract support services.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant difference between FY 2018 and FY 2019.						
Title: Naval Interoperability & Standardization Description: Develop UAS common technical standards implementations to achieve desired capabilities and interoperability between manned/unmanned systems.		Articles: 1.609 -	Articles: 1.947 -	Articles: 1.620 -	Articles: 0.000 -	Articles: 1.620 -
FY 2018 Plans: Continue to develop Unmanned Systems Naval Interoperability Profiles in support of approved naval CONOPS. Support Office of the Secretary of Defense Joint Service and NATO coalition interoperability efforts. Provide government engineering support, program office travel, and contract support services.						
FY 2019 Base Plans: Continue to develop Unmanned Systems Naval Interoperability Profiles in support of approved naval CONOPS. Support DoN, Joint Service and NATO coalition interoperability efforts. Provide government engineering support, program office travel, and contract support services.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603261N / <i>Tactical Airborne Reconnaissance</i>	Project (Number/Name) 2467 / <i>UxS Common Standards, Interoperability and Integration</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) There is no significant difference between FY 2018 and FY 2019.		FY 2017	FY 2018	FY 2019 Base
	Accomplishments/Planned Programs Subtotals	3.265	3.707	3.540
C. Other Program Funding Summary (\$ in Millions) N/A		FY 2019 OCO		FY 2019 Total
Remarks				
D. Acquisition Strategy The department will leverage existing government facilities and resources to develop common technical and interoperability standards for current and future unmanned sensors, communications, and networking capabilities to achieve the required interoperability and integration of unmanned systems represented in approved Naval Concept of Operations (CONOPS). Government engineering support will be used for standards development, architectural analysis, modeling and simulation efforts and testing.				
E. Performance Metrics UAS capabilities delivered to the warfighter are continually improved upon through efforts that increase the level of commonality, standardization, and interoperability between nodes depicted in existing and planned Naval CONOPS.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603261N / <i>Tactical Airborne Reconnaissance</i>				Project (Number/Name) 2467 / <i>UxS Common Standards, Interoperability and Integration</i>							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	18.711	0.000		0.000		0.000		-		0.000	0.000	18.711	-
		Subtotal	18.711	0.000		0.000		0.000		-		0.000	0.000	18.711	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NAWCWD : China Lake, CA	0.520	0.000		0.000		0.000		-		0.000	0.000	0.520	-
Studies & Demonstrations	WR	NAWCAD : Pax River, MD	4.685	0.227	Dec 2016	0.241	Dec 2017	0.245	Dec 2018	-		0.245	Continuing	Continuing	Continuing
Standards Development	C/CPFF	Engility : Lexington Park, MD	1.376	1.404	Jan 2017	1.432	Jan 2018	1.400	Jan 2019	-		1.400	Continuing	Continuing	Continuing
Prior year Support no longer funded in the FYDP	Various	Various : Various	29.295	0.000		0.000		0.000		-		0.000	0.000	29.295	-
		Subtotal	35.876	1.631		1.673		1.645		-		1.645	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior year Test & Eval no longer funded in the FYDP	Various	Various : Various	2.627	0.000		0.000		0.000		-		0.000	0.000	2.627	-
		Subtotal	2.627	0.000		0.000		0.000		-		0.000	0.000	2.627	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603261N / <i>Tactical Airborne Reconnaissance</i>				Project (Number/Name) 2467 / <i>UxS Common Standards, Interoperability and Integration</i>							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	4.377	0.203	Jan 2017	0.207	Jan 2018	0.218	Jan 2019	-		0.218	Continuing	Continuing	Continuing
Government Engineering Support	WR	NAWCAD : Pax River, MD	9.754	1.429	Dec 2016	1.825	Dec 2017	1.675	Dec 2018	-		1.675	Continuing	Continuing	Continuing
Travel	WR	NAVAIR HQ : Pax River, MD	0.556	0.002	Oct 2016	0.002	Oct 2017	0.002	Oct 2018	-		0.002	Continuing	Continuing	Continuing
Prior year Mgmt Services no longer funded in the FYDP	Various	Various : Various	1.050	0.000		0.000		0.000		-		0.000	0.000	1.050	-
Subtotal			15.737	1.634		2.034		1.895		-		1.895	Continuing	Continuing	N/A
Remarks Travel contract type is TO.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			72.951	3.265		3.707		3.540		-		3.540	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018													
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)															
1319 / 4								PE 0603261N / <i>Tactical Airborne Reconnaissance</i>								2467 / <i>UxS Common Standards, Interoperability and Integration</i>															
UAV CONOPS	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Unmanned Aircraft System (UAS) Targeting																															
Weapons and Payload Employment																															
Task and Manning Assessment																															
Standards Based Interoperability																															
Naval Interoperability and Standardization																															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603261N / <i>Tactical Airborne Reconnaissance</i>	Project (Number/Name) 2467 / <i>UxS Common Standards, Interoperability and Integration</i>	
Schedule Details			
Events by Sub Project	Start	End	
Quarter	Year	Quarter	Year
<i>UxS Common Standards, Interoperability and Integration</i>			
Naval Interoperability and Standardization:	1	2017	4
			2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603382N / Advanced Combat Systems Tech								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	67.237	3.583	61.381	59.741	-	59.741	67.098	75.244	46.307	50.826	Continuing	Continuing	
0324: Adv Combat System Technology	67.237	1.583	1.869	1.813	-	1.813	1.797	1.835	1.875	1.912	Continuing	Continuing	
0385: Rapid Prototype Development	0.000	1.000	25.876	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	26.876	
0399: Unmanned Rapid Prototype Development	0.000	1.000	15.361	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.361	
3422: SHARC Surface Platform	0.000	0.000	6.775	9.935	-	9.935	11.445	13.459	2.968	0.000	0.000	44.582	
3423: LOCUST	0.000	0.000	3.500	3.454	-	3.454	2.960	5.948	7.940	8.103	Continuing	Continuing	
3424: Heterogeneous Collaborative Unmanned Systems (HCUS)	0.000	0.000	8.000	7.896	-	7.896	3.922	0.000	0.000	0.000	0.000	19.818	
3437: EMW/SEWIP/SSEE Accelerator	0.000	0.000	0.000	21.584	-	21.584	23.771	23.773	0.000	0.000	0.000	69.128	
3438: Innovative Naval Prototype (INP) Transition (6.4)	0.000	0.000	0.000	15.059	-	15.059	23.203	30.229	33.524	40.811	Continuing	Continuing	

Note

Plans and associated resources in Program Element (PE) 0603382N ADVANCED COMBAT SYSTEMS TECH, Project Unit (PU) 0385 Rapid Prototype Development, and PU 0399 Unmanned Rapid Prototype Development are realigned effective FY2019 to PE 0604030N Rapid Prototyping, Experimentation and Demonstration, PU 0385 Rapid Prototype Development.

A. Mission Description and Budget Item Justification

The Advanced Combat System Technology line is to evolve the technical and business practices for programs to change to an open architecture construct. The program was constructed to mature both technical and business model integration for C5I systems programs of record in an open architecture environment. The priority was incorporating the principles of modular design and design disclosure, reusable application software, interoperability and secure information exchange, lifecycle affordability and encouraging competition and collaboration.

Project Unit 0324: Funding is to fully implement the Naval Open (Systems) Architecture (OSA) strategy. The implementation of this strategy provides the tools and leadership for assisting programs and the Naval Research and Development Establishment through the technical, business and cultural transition to OSA. The primary tools and assistance is established through a limited set of technical reference frameworks, consistent contract language guidance, Intellectual Property strategies and

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)			
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0603382N / <i>Advanced Combat Systems Tech</i>			
<p>improvements in transparency of design disclosure and information exchange on past and current investments to support portfolio management and cross-program reuse. The OSA transformation effort will be applied to programs of record and coupled with rapid prototyping efforts being realized as management efficiencies both within programs and in accelerated acquisition efforts. Those elements include ensuring that all naval systems, families of systems, programs and prototypes move to modular OSA in accordance with Department of Defense (DoD) Instruction 5000.01 of 7 January 2015 which mandates that all DoD programs utilize Modular OSA to rapidly field affordable and interoperable systems. This project facilitates a strategic shift in the technical and business methods to establish cooperation and cross-domain/COI business relationships. This improves innovation and economies of scale throughout the Navy and Marine Corps. This leadership effort has identified the business case and potential return on investment for moving the Navy towards an open systems approach, supported the development of open systems technologies, and integrated best business and technical practices for open systems development within Naval acquisition. Naval OSA ensures Navy-wide system architectures become extensible and scalable in function, capacity, and workload to meet Joint warfighting requirements. This also includes the identification and development of common software components, functions, reuse methodologies, and extensible product lines.</p>				
<p>Project Unit 0385: The Rapid Prototype Development project funds a strategic focus on rapid prototyping of innovative combat system technologies and engineering innovations to explore Fleet-proposed capability concepts and needs, as well as foster advancements in naval warfighting capabilities. With an emphasis on rapidly prototyping mature technologies, the project is intended to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains. Concepts and enabling technologies include but are not limited to: directed energy weapons, hypersonics, unmanned systems, artificial intelligence, machine learning, and multi-domain operations.</p>				
<p>Project Unit 0399: Funding realigned to the Rapid Prototype Development project (Project Number 0385) in FY 2019.</p>				
<p>Project Unit 3422: The SHARC Surface Platforms demonstration project is part of the Department of Defense Third Offset Strategy as one element in the Sensor Grid category for 24/7 autonomy infused Situational Awareness (SA). This project will purchase Commercial-off-the-Shelf SHARC Platforms (wave gliders) and integrate four (4) unique Government-owned classified mission payloads focused on the detection of threats. These capabilities will enable CONOPS development in an operationally relevant environment to demonstrate how these technologies can improve the SA to the battlespace Commanders.</p>				
<p>Project Unit 3423: The LOCUST demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. LOCUST leverages the BA-3 Innovative Naval Prototype program developing and demonstrating swarming technology. The BA-3 effort is developing both the air vehicle, UAS swarming behaviors, and miniaturized sensor systems. ONR has demonstrated an autonomous system capable of launching 33 UASs in 40 seconds and flying them in a coordinated swarm. This BA-4 effort is trailing the BA-3 demonstration of technologies by a fiscal quarter and then demonstrating the technology in operationally relevant environments with military mission applications.</p>				
<p>Project Unit 3424: The Heterogeneous Collaborative Unmanned Systems (HCUS) demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. HCUS provides autonomous, tactical monitoring of an adversary's port-sized littoral area for an extended period of time with capability to apply limited offensive effects on-demand. Vehicles and sensors are intended to be used in contested environments - employing local communications nets, autonomous vehicle behavior, low bandwidth command links and local navigation with no requirement for GPS input.</p>				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)				
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0603382N / <i>Advanced Combat Systems Tech</i>				
HCUS systems can be encapsulated and deployed as a single payload, or a small number of payload packages designed for specific missions. The payloads can be carried into theater by various manned or unmanned platforms depending on the degree of stealth required. A week-long project demonstration will simulate covert deployment, operations of autonomous UAVs over the area of interest, data exfiltration to a remote operator, autonomous UAV recharging via USVs and/or UUVs, deployment of unmanned ground sensors for persistent sensing, and remote operator on-demand offensive attack on a simulated target.					
Project 3438: This activity addresses the advanced component development and prototype demonstration associated with ONR's Innovative Naval Prototypes (INP) Program and the Leap Ahead Technology (LA-Tech) investments. INP and LA-Tech investments represent game changing technologies with the potential to revolutionize operational concepts. They are disruptive in nature as they would dramatically change the way naval forces fight. INPs and LA-Techs push the imagination of our nation's technical talent to deliver transformational warfighting capabilities. Investments may include such mission areas as Unmanned and Autonomous Systems, Directed Energy / Electric Weapons, Electromagnetic Maneuver Warfare, Cyber Warfare, and Undersea Warfare. Funding to be realigned from the Unmanned Rapid Prototype Development project (Project Number 0399) in FY 2019.					
Project 3437: The EMW/SEWIP/SSEE Accelerator is part of the Department of Defense Third Offset Strategy to improve real time Electro-Magnetic Maneuver Warfare operations. This effort will develop integrated cross platform active and passive sensing solutions, next generation network and real time spectrum operations.					
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	57.034	61.381	65.946	-	65.946
Current President's Budget	3.583	61.381	59.741	-	59.741
Total Adjustments	-53.451	0.000	-6.205	-	-6.205
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.063	0.000			
• Program Adjustments	0.000	0.000	22.000	-	22.000
• Rate/Misc Adjustments	0.000	0.000	-28.205	-	-28.205
• Congressional General Reductions	-0.005	-	-	-	-
Adjustments					
• Congressional Directed Reductions	-53.383	-	-	-	-
• Congressional Directed Reductions					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603382N / Advanced Combat Systems Tech				0324 / Adv Combat System Technology			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0324: Adv Combat System Technology	67.237	1.583	1.869	1.813	-	1.813	1.797	1.835	1.875	1.912	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project Unit 0324: Funding is to fully implement the Naval Open (Systems) Architecture (OSA) strategy. The implementation of this strategy provides the tools and leadership for assisting programs and the Naval Research and Development Establishment (NR&DE) through technical, business and policy transition to OSA. The primary tools and assistance are provided through a limited set of technical reference frameworks, consistent contract language guidance, Intellectual Property strategies and improvements in transparency of design disclosure and information exchange on past and current investments to support portfolio management and cross-program reuse. The OSA transformation effort will be applied to programs of record and coupled with rapid prototyping efforts being realized as management efficiencies both within programs and in accelerated acquisition efforts. Those elements include ensuring that all naval systems, families of systems, programs and prototypes move to modular OSA in accordance with Department of Defense (DoD) Instruction 5000.01 of 7 January 2015 which mandates that all DoD programs utilize Modular Open Systems Architecture to rapidly field affordable and interoperable systems. This project facilitates a strategic shift in the technical and business methods to establish cooperation, cross-domain, and community of interest business relationships. This improves innovation and economies of scale throughout the Navy and Marine Corps. This leadership effort has identified the business case and potential return on investment for moving the Navy towards an open systems approach, supported the development of open systems technologies, and integrated best business and technical practices for open systems development within Naval acquisition. Naval OSA ensures Navy-wide system architectures become extensible and scalable in function, capacity, and workload to meet Joint warfighting requirements. This also includes the identification and development of common software components, functions, reuse methodologies, and extensible product lines.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Align the Naval Enterprise Across All Domains to Implement OA Articles:	0.988	0.631	0.562	0.000	0.562
FY 2018 Plans: Coordinate the development of hardware and software in using Technical Reference Frameworks for common products that could be employed across a variety of platforms.	-	-	-	-	-
FY 2019 Base Plans: The FY 2019 budget plan is to continue to execute the FY2018 plan in addition to support program Modular Open Architecture development in coordination with accelerated acquisition projects and POR and define where Modular Open Systems Architecture is needed based on technology growth areas and Threats.					
FY 2019 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0324 / Adv Combat System Technology				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant difference between FY18 and FY19.						
Title: Change the Naval and Marine Corps policy and guidance to Institutionalize OA Principle FY 2018 Plans: Coordinate the development of hardware and software in using Technical Reference Frameworks for common products that could be employed across a variety of platforms. FY 2019 Base Plans: The FY 2019 budget will be utilized to continue to execute the FY2018 plan in addition to support the initiation of Modular Open Systems Architecture for rapid prototyping projects to be incorporated in conjunction with platform system block upgrades and promote policy changes that support the implementation and standardization of Modular Open Systems Architecture for POR interoperability efforts. FY 2019 OCO Plans: N/A	Articles: - FY 2018 to FY 2019 Increase/Decrease Statement: These are Economic Adjustments due to inflation from FY2018 to FY2019.	0.208	0.624	0.619	0.000	0.619
Title: OA Systems Engineering Leadership FY 2018 Plans: Continue FY2017 Plan in addition to: Sponsor Communities of Interest to support cooperation between programs FY 2019 Base Plans: The FY 2019 budget will be utilized to continue to execute the FY2018 plan in addition to coordinate the development and maintenance of Modular Open Systems Architecture interfaces and standards, promote projects that have successfully implemented OA in its systems, and to delegate authority as appropriate to enable speed and agility. FY 2019 OCO Plans:	Articles: - FY 2018 to FY 2019 Increase/Decrease Statement:	0.159	0.225	0.232	0.000	0.232

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0324 / Adv Combat System Technology				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant difference between FY18 and FY19						
Title: Knowledge Products for Implementing OSA	Articles:	0.228	0.389	0.400	0.000	0.400
FY 2018 Plans: Continue with FY2017 Plan in addition to: Work with the Naval Laboratories to establish OSA as the default method for creating prototypes		-	-	-	-	-
FY 2019 Base Plans: The FY 2019 budget will continue to execute the FY2018 plan and to provide Scientists and Engineers within NR&DE common products that can be used across the enterprise and identify test assets that can be leveraged between programs to implement OSA and accelerate acquisition.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: These are Economic Adjustments due to inflation from FY2018 to FY2019.	Accomplishments/Planned Programs Subtotals	1.583	1.869	1.813	0.000	1.813
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
This has been a Navy Acquisition Executive directed effort to fundamentally alter the business, technical and policy for warfare systems acquisition to result in improved cost, increased access to innovation, a reduction in time to field, and promote cultural environment change. The Navy's OSA Enterprise effort built off past successes such as the Acoustic Rapid Commercial-off-the-Shelf Insertion started program and established this core OA Budget line (policy statement dated 5 August 2004). The strategy was further refined in the Deputy Chief of Naval Operations (DCNO) requirement of 23 December 2005 (N6/7), the Naval OSA Strategy of 2011 and extended for applicability to the other Defense Services under the DoD Better Buying Power initiative. This effort continues to expand into and support the related strategic shift to Rapid Prototyping, Experimentation and Demonstration.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / <i>Advanced Combat Systems Tech</i>	Project (Number/Name) 0324 / <i>Adv Combat System Technology</i>
E. Performance Metrics Change Naval Processes and business practices to cost-effectively innovate and rapidly deploy improved warfighting capability based on fleet requirements. Provide OSA to field common, interoperable capabilities; Change Navy and Marine Corps Business processes to Institutionalize OSA Principles.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0324 / Adv Combat System Technology							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SE/OA Domain Support	C/FP	APL/ IET Contract : VARIOUS	2.576	0.000		0.000		0.000		-		0.000	0.000	2.576	Continuing
Systems Engineering	MIPR	NSWC / Dahlgren : Dahlgren, VA	13.307	0.000		0.000		0.000		-		0.000	0.000	13.307	Continuing
Systems Engineering	WR	NSWC/CRANE, Carderock, DISA : VARIOUS	3.119	0.000		0.000		0.000		-		0.000	0.000	3.119	Continuing
Systems Engineering	C/CPAF	ASSETT; Lockheed Martin, NJ; Gartner, VA : Washington DC	5.114	0.000		0.000		0.000		-		0.000	0.000	5.114	Continuing
OA DOMAIN SUPPORT	WR	NUWC/Newport, Spawar, Navair : VARIOUS	11.931	0.000		0.000		0.000		-		0.000	0.000	11.931	Continuing
SE/Signal Processor	C/CPAF	Lockheed Martin : VARIOUS	6.000	0.000		0.000		0.000		-		0.000	0.000	6.000	Continuing
SE/Signal Processor	C/CPAF	BAE : VARIOUS	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	Continuing
SE/Signal Processor	C/CPAF	Raytheon : VARIOUS	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	Continuing
SE/Signal Processor	WR	NSWC/DD, NRL, PHD : VARIOUS	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	Continuing
Align the Naval Enterprise Across All Domains to Implement OA	WR	NSWCDD : VARIOUS	1.000	0.988	Mar 2017	0.631	Oct 2017	0.562	Oct 2018	-		0.562	0.000	3.181	-
Change the Naval and Marine Corps policy and guidance to Institutionalize OA Principle	WR	NSWC, NRL, NUWC, NAWC : VARIOUS	0.192	0.208	Jul 2017	0.624	Oct 2017	0.619	Oct 2018	-		0.619	0.000	1.643	-
OA Systems Engineering Leadership	WR	NSWC, NRL, NUWC, NAWC : VARIOUS	0.161	0.159	Jul 2017	0.225	Oct 2017	0.232	Oct 2018	-		0.232	0.000	0.777	-
Knowledge Products for Implementing OSA	WR	NSWC, NRL, NUWC, NAWC, NUW, NEWPORT,	0.219	0.228	Jul 2017	0.389	Oct 2017	0.400	Oct 2018	-		0.400	0.000	1.236	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0324 / Adv Combat System Technology								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
		NSWC CRANE : VARIOUS														
				Subtotal	44.619	1.583		1.869		1.813		-	1.813	0.000	49.884	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Industry Development	C/FP	IBM, ANGLE, TBD (New IET Contract) : VARIOUS	9.805	0.000		0.000		0.000		-		0.000	0.000	9.805	Continuing	
Technical Data-Academia	WR	NPS-Monterey/DAU : MONTEREY, CA	2.348	0.000		0.000		0.000		-		0.000	0.000	2.348	Continuing	
Software Development	C/FP	TRIDENT, ASSET : VARIOUS	0.309	0.000		0.000		0.000		-		0.000	0.000	0.309	Continuing	
				Subtotal	12.462	0.000		0.000		0.000		-	0.000	0.000	12.462	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Operational Test & Evaluation	WR	NSWC/DD : DAHLGREN, VA	2.216	0.000		0.000		0.000		-		0.000	0.000	2.216	Continuing	
OA Asset Repository (SBIR Account)	WR	Miscellaneous : VARIOUS	0.150	0.000		0.000		0.000		-		0.000	0.000	0.150	Continuing	
				Subtotal	2.366	0.000		0.000		0.000		-	0.000	0.000	2.366	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0324 / Adv Combat System Technology							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	Miscellaneous : VARIOUS	3.021	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SBIR Assessment (Cong Add)	WR	NSWC/DD : DAHLGREN, VA	4.748	0.000		0.000		0.000		-		0.000	0.000	4.748	Continuing
DAWDF	TBD	TBD : TBD	0.021	0.000		0.000		0.000		-		0.000	0.000	0.021	Continuing
Subtotal		7.790	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			67.237	1.583		1.869		1.813		-		1.813	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)					
1319 / 4					PE 0603382N / Advanced Combat Systems Tech					0324 / Adv Combat System Technology					
Proj 0324															
FY 2017				FY 2018				FY 2019				FY 2020			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Incorporate OA Principles in Acquisition Strategies and Contracts															
Change Culture through OA Education, Outreach and Training															
Conduct Program/Prototype Assessments															
Adapt ONR Technologies/NR&DE Technologies															
Publish Updates to Guidebooks															
Host Contracting/Industry Symposium															
Deliver Report to Congress															
Host OA Naval Laboratory Consortium															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0324 / Adv Combat System Technology

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0324				
Incorporate OA Principles in Acquisition Strategies and Contracts	1	2017	3	2023
Change Culture through OA Education, Outreach and Training	1	2017	4	2023
Conduct Program/Prototype Assessments	2	2017	2	2023
Adapt ONR Technologies/NR&DE Technologies	1	2017	3	2023
Publish Updates to Guidebooks	3	2017	3	2023
Host Contracting/Industry Symposium	1	2017	4	2023
Deliver Report to Congress	1	2017	4	2023
Host OA Naval Laboratory Consortium	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0385 / Rapid Prototype Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0385: <i>Rapid Prototype Development</i>	0.000	1.000	25.876	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	26.876
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

The funding decrease from FY2018 to FY2019 reflects the realignment of requirements and associated resources from Program Element (PE) 0603382N ADVANCED COMBAT SYSTEMS TECH, Project Unit (PU) 0385 Rapid Prototype Development to PE 0604030N Rapid Prototyping, Experimentation and Demonstration, PU 0385 Rapid Prototype Development.

A. Mission Description and Budget Item Justification

Department of Navy (DON) leadership has acknowledged that maintaining maritime superiority depends in part on our ability to accelerate the speed of warfighting and technological innovations in order to extend our advantage to offset our adversaries' growing capabilities. It is fundamental to the DON's efforts to improve our acquisition outcomes. This project is aligned with, and in direct response to, calls for increased prototyping and experimentation in USD(AT&L)'s Better Buying Power 3.0, Secretary of the Navy's (SECNAV) Task Force Innovation direction, and the CNO direction to achieve High Velocity Learning at Every Level. These efforts will reinvigorate and increase the use of prototyping to rapidly field new warfighting capabilities, concepts and technologies, and engineering solutions.

The Rapid Prototype Development project funds a strategic focus on rapid prototyping of innovative combat system technologies and engineering innovations to explore Fleet-proposed capability concepts and needs, as well as foster advancements in naval warfighting capabilities. With an emphasis on rapidly prototyping mature technologies, the project is intended to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains. Concepts and enabling technologies include but are not limited to; directed energy weapons, hypersonics, unmanned systems, artificial intelligence, machine learning, and multi-domain operations.

Specific projects under this project number will be selected and executed in accordance with the Department of the Navy (DoN) Accelerated Acquisition Process as described in SECNAVINST 5000.42. The Secretary of the Navy will notify Congress prior to initiation of a project under this project number in accordance with the requirements established in Section 216 of the FY 2017 National Defense Authorization Act.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Rapid Prototype Development, Experimentation and Demonstration	1.000	25.876	0.000	0.000	0.000
FY 2018 Plans:	Articles: -	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0385 / Rapid Prototype Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Project 0385 funding supports the SURTASS-E Rapid Prototyping, Experimentation and Demonstration (RPED) project which will provide a modular, flexible, and rapidly deployable mobile acoustic wide-area surveillance capability for installation aboard a vessel of opportunity (VOO). The project will deliver and demonstrate one system consisting of International Organization for Standardization containerized mission system ship set, installed on a VOO. Specific FY18 activities include: design and development of the SURTASS-E winch and handling system; procurement of long lead sub-systems for the command, control, communications, computers and intelligence (C4I) van; mission system hardware and software development and integration; VOO assessment, leasing and platform evaluation; VOO installation hardware; towed array towing hardware; acoustic processing development; and system level ship integration and performance assessment .						
Project 0385 will support additional emergent FY2018 RPED initiatives, as designated by the Accelerated Acquisition Board of Directors (AABoD) in accordance with SECNAVINST 5000.42 to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The funding decrease from FY2018 to FY2019 reflects the realignment of requirements and associated resources from Program Element (PE) 0603382N ADVANCED COMBAT SYSTEMS TECH, Project Unit (PU) 0385 Rapid Prototype Development to PE 0604030N Rapid Prototyping, Experimentation and Demonstration, PU 0399 0385 Rapid Prototype Development.						
Accomplishments/Planned Programs Subtotals		1.000	25.876	0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / <i>Advanced Combat Systems Tech</i>	Project (Number/Name) 0385 / <i>Rapid Prototype Development</i>
D. Acquisition Strategy <p>Projects identified for execution under this project number are non-acquisition programs. Each project will develop a project plan to support project execution. Project plans will include a project schedule and technical requirements and objectives to measure project performance. The selected technical solutions will be demonstrated in operationally relevant environments to assess their ability to meet warfighter requirements. Project deliverables include actual integrated hardware/software prototype systems, CONOPS, requirements, test reports, technical data, and associated doctrine, organization, training, leadership and education, and personnel aspects necessary to support decision making. These deliverables will be used to support project disposition decisions to include transition of technologies to acquisition, further refinement of the technology, or termination and reinvestment of remaining funds to other technologies that add military value.</p>		
E. Performance Metrics <p>Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0385 / Rapid Prototype Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Mission System HW/SW	SS/CPFF	John Hopkins : Maryland	0.000	0.000		7.700	Mar 2018	0.000		-		0.000	7.700	15.400	-
VOO Evaluation	WR	Military Sealift Command : Norfolk, Va	0.000	0.000		3.300	Mar 2018	0.000		-		0.000	3.300	6.600	-
Winch Design and Procurement	WR	NAVFAC : California	0.000	0.000		3.300	Mar 2018	0.000		-		0.000	3.300	6.600	-
Towed Army Test Equip and VOO Assessment	WR	NSWC : Carderock, Md	0.000	0.000		0.700	Mar 2018	0.000		-		0.000	0.700	1.400	-
C41 Suite Development and Integration	WR	NAWC : Panama City, Fl	0.000	0.000		3.600	Mar 2018	0.000		-		0.000	3.600	7.200	-
Prototype Development, Experimentation and Demonstration	Various	Va : TBD	0.000	1.000	Nov 2017	0.000	Mar 2018	0.000		-		0.000	0.000	1.000	-
VOO Installation Hardware	C/CPFF	Oceaneering Intl : San Diego, Ca	0.000	0.000		0.400	Mar 2018	0.000		-		0.000	0.400	0.800	-
Common Support Modules Dev Integration	MIPR	PMS 420 : Washington, DC	0.000	0.000		4.100	Jun 2018	0.000		-		0.000	5.000	9.100	-
Towed System Shore Support	WR	SSC Lant : Little Creek, Va	0.000	0.000		1.000	Mar 2018	0.000		-		0.000	1.000	2.000	-
Prototype Dev, Experiment & Demonstration	Various	Various : Various	0.000	0.000		1.776	Mar 2018	0.000		-		0.000	0.000	1.776	-
Subtotal			0.000	1.000		25.876		0.000		-		0.000	25.000	51.876	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	1.000		25.876		0.000		-		0.000	25.000	51.876	N/A

Remarks

Support and Test and Evaluation costs are directly associated with the delivery of the primary product and included in the product development cost category for rapid prototype development, experimentation and demonstration cost categories.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)							
1319 / 4					PE 0603382N / Advanced Combat Systems Tech					0385 / Rapid Prototype Development							
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 0385		Prototype Development, Experimentation and Demonstration															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0385 / Rapid Prototype Development	
Schedule Details			
Events by Sub Project	Start	End	
Proj 0385	Quarter	Year	Quarter
Prototype Development, Experimentation and Demonstration	1	2019	4
			2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0399 / Unmanned Rapid Prototype Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0399: <i>Unmanned Rapid Prototype Development</i>	0.000	1.000	15.361	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.361	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		

Note

The funding decrease from FY2018 to FY2019 reflects the realignment of requirements and associated resources from Program Element (PE) 0603382N ADVANCED COMBAT SYSTEMS TECH, Project Unit (PU) 0399 Unmanned Rapid Prototype Development to PE 0604030N Rapid Prototyping, Experimentation and Demonstration, PU 0385 Rapid Prototype Development.

A. Mission Description and Budget Item Justification

Department of Navy (DON) leadership has acknowledged that maintaining maritime superiority depends in part on our ability to accelerate the speed of warfighting and technological innovations in order to extend our advantage to offset our adversaries' growing capabilities. It is fundamental to the DON's efforts to improve our acquisition outcomes. This project is aligned with, and in direct response to, calls for increased prototyping and experimentation in USD(AT&L)'s Better Buying Power 3.0, Secretary of the Navy's (SECNAV) Task Force Innovation direction, and the CNO direction to achieve High Velocity Learning at Every Level. These efforts will reinvigorate and increase the use of prototyping to rapidly field new warfighting capabilities, concepts and technologies, and engineering solutions.

The Rapid Prototype Development project funds a strategic focus on rapid prototyping of innovative combat system technologies and engineering innovations to explore Fleet-proposed capability concepts and needs, as well as foster advancements in naval warfighting capabilities. With an emphasis on rapidly prototyping mature technologies, the project is intended to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains. Concepts and enabling technologies include but are not limited to; directed energy weapons, hypersonics, unmanned systems, artificial intelligence, machine learning, and multi-domain operations.

Specific projects under this project number will be selected and executed in accordance with the Department of the Navy (DoN) Accelerated Acquisition Process as described in SECNAVINST 5000.42. The Secretary of the Navy will notify Congress prior to initiation of a project under this project number in accordance with the requirements established in Section 216 of the FY 2017 National Defense Authorization Act.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<i>Title:</i> Unmanned Rapid Prototype Development, Experimentation and Demonstration <i>Articles:</i>	1.000	15.361	0.000	0.000	0.000

Description: Department of Navy (DON) leadership has acknowledged that maintaining maritime superiority depends in part on our ability to accelerate the speed of warfighting and technological innovations in order to

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0399 / Unmanned Rapid Prototype Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
extend our advantage to offset our adversaries' growing capabilities. It is fundamental to the DON's efforts to improve our acquisition outcomes. This project is aligned with, and in direct response to, calls for increased prototyping and experimentation in USD(AT&L)'s Better Buying Power 3.0, Secretary of the Navy's (SECNAV) Task Force Innovation direction, and the CNO direction to achieve High Velocity Learning at Every Level. These efforts will reinvigorate and increase the use of prototyping to rapidly field new warfighting capabilities, concepts and technologies, and engineering solutions.	The Unmanned Rapid Prototype Development project funds a strategic focus on rapid prototyping of innovative combat system technologies and engineering innovations to explore Fleet-proposed capability concepts and needs, as well as foster advancements in naval warfighting capabilities. With an emphasis on rapidly prototyping mature technologies, the project is intended to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains.					
Specific projects under this project number will be selected and executed in accordance with the Department of the Navy (DoN) Accelerated Acquisition Process as described in SECNAVINST 5000.42. The Secretary of the Navy will notify Congress prior to initiation of a project under this project number in accordance with the requirements established in Section 216 of the FY 2017 National Defense Authorization Act.						
FY 2018 Plans: Support FY2018 RPED initiatives, as designated by the AABoD, to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains.						
FY 2019 Base Plans: Not applicable.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The funding decrease from FY2018 to FY2019 reflects the realignment of requirements and associated resources from Program Element (PE) 0603382N ADVANCED COMBAT SYSTEMS TECH, Project Unit (PU) 0399 Unmanned Rapid Prototype Development to PE 0604030N Rapid Prototyping, Experimentation and						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0399 / Unmanned Rapid Prototype Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base
Demonstration, PU 0385 Rapid Prototype Development. This realignment programmed to provide maximum funding flexibility for DoN Accelerated Acquisition Board of Directors (AABoD) designated Rapid Prototyping, Experimentation and Demonstration (RPED) projects.					FY 2019 OCO
Accomplishments/Planned Programs Subtotals		1.000	15.361	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)		0.000			
N/A					
Remarks					
D. Acquisition Strategy Projects identified for execution under this project number are non-acquisition programs. Each project will develop a project plan to support project execution. Project plans will include a project schedule and technical requirements and objectives to measure project performance. The selected technical solutions will be demonstrated in operationally relevant environments to assess their ability to meet warfighter requirements. Project deliverables include actual integrated hardware/software prototype systems, CONOPS, requirements, test reports, technical data, and associated doctrine, organization, training, leadership and education, and personnel aspects necessary to support decision making. These decisions include the transition of technologies to acquisition, further refinement of the technology, or termination and reinvestment of remaining funds to other technologies that add military value.					
E. Performance Metrics Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.					

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 0399 / Unmanned Rapid Prototype Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype Development, Experimentation and Demonstration	Various	Various : Various	0.000	1.000	Jul 2017	15.361	Mar 2018	0.000		-		0.000	0.000	16.361	-
Subtotal			0.000	1.000		15.361		0.000		-		0.000	0.000	16.361	N/A

Remarks
Support and Test and Evaluation costs are directly associated with the delivery of the primary product and included in the product development cost category for rapid prototype development, experimentation and demonstration cost categories.

		Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		0.000	1.000		15.361		0.000		-		0.000	0.000	16.361	N/A

Remarks
Support and Test and Evaluation costs are directly associated with the delivery of the primary product and included in the product development cost category for rapid prototype development, experimentation and demonstration cost categories.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603382N / Advanced Combat Systems Tech					0399 / Unmanned Rapid Prototype Development											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 0399		Prototype Development, Experimentation and Demonstration																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 0399 / Unmanned Rapid Prototype Development	
Schedule Details			
Events by Sub Project		Start	End
<i>Proj 0399</i>		Quarter	Year
Prototype Development, Experimentation and Demonstration		4	2017
		4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3422 / SHARC Surface Platform			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3422: SHARC Surface Platform	0.000	0.000	6.775	9.935	-	9.935	11.445	13.459	2.968	0.000	0.000	44.582
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The SHARC demonstration project is part of the Department of Defense Third Offset Strategy as one element in the Sensor Grid category for 24/7 autonomy infused Situational Awareness (SA). This project will purchase Commercial-off-the-Shelf SHARC Platforms (wave gliders) and integrate four (4) unique Government-owned classified mission payloads focused on the detection of threats. These capabilities will enable CONOPS development in an operationally relevant environment to demonstrate how these technologies can improve the SA to the battlespace Commanders.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
0.000	6.775	9.935	0.000	9.935
-	-	-	-	-

Title: Sensor Hosting Autonomous Remote Craft (SHARC) **Articles:**

Description: This is a new project beginning in FY2018 - This project will demonstrate the warfighting utility of multiple, simultaneous, wideband data links for signal and imagery data transmission between host assets and Operational level processing systems.

FY 2018 Plans:
Emerging technologies and engineering innovations from Naval/DoD research and development and industry, will be integrated to demonstrate secure and reliable collection, analysis, and fusion of ISR and targeting data from organic assets and sensors. This project will demonstrate the warfighting utility of multiple, simultaneous, wideband data links for signal and imagery data transmission between host assets and Operational level processing systems. Additionally, technologies providing Tactical level access to host asset ISR data will be demonstrated. This project will integrate mature technologies developed in the areas of low probability of intercept and detection (LPI/LPD) techniques, high data rate exchange, long-range multi-band and wideband links, networked nodes and software-defined modes, encryption, and signal processing modules. Additional details are available at higher classification levels.

FY 2019 Base Plans:
Complete requirements analysis and update component and subsystem specifications as required. Procure required SHARC platforms to include additional platforms to meet USPACOM emergent requirements. SPAWAR SSC Charleston will conduct initial integration and functional lab testing of classified payloads. The Maritime

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3422 / SHARC Surface Platform		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
Surveillance Systems (MSS) Program Office (PEO SUBS, PMS-485) will initiate and coordinate the development of system level test plans and conduct initial system level test and evaluation to assess performance.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Increase in FY2019 base funding is required to enhance capabilities for additional SHARC platforms and to support emergent USPACOM requirements.				
Accomplishments/Planned Programs Subtotals		0.000	6.775	9.935
		0.000	0.000	9.935
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy The Maritime Surveillance Systems (MSS) Program Office (PEO SUB PMS 485) will procure commercial wave gliders from Boeing Liquid Robotics Division (FFP Contract) and TBD Government organizations and Contractors for sensor systems X,Y,Z (CPFF). PMS 485 will task SPAWAR SSC Charleston to refurbish two type V sensor systems and for the engineering and technical integration, testing, and demonstration support. Sensors V,X,Y, and Z are all classified payloads.				
E. Performance Metrics Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3422 / SHARC Surface Platform							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements analysis	MIPR	Naval Weapons Development Center : Norfolk, VA	0.000	0.000		0.105	Oct 2017	0.050	Oct 2018	-		0.050	0.000	0.155	-
Requirements analysis	MIPR	PMS-485 Maritime Surveillance System : Washington Navy Yard, DC	0.000	0.000		0.190	Oct 2017	0.050	Oct 2018	-		0.050	0.000	0.240	-
Requirements analysis	MIPR	SPAWAR SSC : North Charleston, SC	0.000	0.000		0.600	Oct 2017	0.200	Oct 2018	-		0.200	0.000	0.800	-
Purchase COTS SHARC platforms	C/FP	PMS-485 Maritime Surveillance System : Washington Navy Yard, DC	0.000	0.000		1.440	Jan 2018	4.135	Dec 2018	-		4.135	0.000	5.575	-
Procure and mature Sensor technologies	C/CPFF	SPAWAR SSC : North Charleston, SC	0.000	0.000		1.740	Jan 2018	0.000	Dec 2018	-		0.000	0.000	1.740	-
5. Build/Assemble/Integrate Phase/Lab Test	C/BA	SPAWAR SSC : North Charleston, SC	0.000	0.000		1.750	Mar 2018	4.000	Mar 2019	-		4.000	0.000	5.750	-
Subtotal			0.000	0.000		5.825		8.435		-		8.435	0.000	14.260	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation Phase	MIPR	Naval Weapons Development Center : Norfolk, VA	0.000	0.000		0.250	Oct 2017	0.400	Mar 2019	-		0.400	0.000	0.650	-
Test & Evaluation Phase	MIPR	PMS-485 Maritime Surveillance System : Washington Navy Yard, DC	0.000	0.000		0.200	Oct 2017	0.300	Mar 2019	-		0.300	0.000	0.500	-
Test & Evaluation Phase	MIPR	SPAWAR SSC : North Charleston, SC	0.000	0.000		0.200	Oct 2017	0.300	Mar 2019	-		0.300	0.000	0.500	-
Subtotal			0.000	0.000		0.650		1.000		-		1.000	0.000	1.650	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3422 / SHARC Surface Platform							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Oversight and Manage Project	MIPR	PMS-485 Maritime Surveillance System : Washington Navy Yard, DC	0.000	0.000		0.300	Oct 2017	0.500	Oct 2018	-		0.500	0.000	0.800	-
Subtotal			0.000	0.000		0.300		0.500		-		0.500	0.000	0.800	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		6.775		9.935		-		9.935	0.000	16.710	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy														Date: February 2018													
Appropriation/Budget Activity							R-1 Program Element (Number/Name)							Project (Number/Name)													
1319 / 4							PE 0603382N / Advanced Combat Systems Tech							3422 / SHARC Surface Platform													
Proj 3422																											
FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
SHARC technology demonstration: Requirements Analysis																											
SHARC technology demonstration: Purchase COTS SHARC platforms																											
SHARC technology demonstration: Procure and mature Sensor technologies																											
SHARC technology demonstration: Build/Assemble/Integrate Phase/Lab Test																											
SHARC technology demonstration: Test and Evaluation																											
SHARC technology demonstration: Program Management																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3422 / SHARC Surface Platform

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3422				
SHARC technology demonstration: Requirements Analysis	1	2018	2	2020
SHARC technology demonstration: Purchase COTS SHARC platforms	2	2018	1	2019
SHARC technology demonstration: Procure and mature Sensor technologies	2	2018	1	2019
SHARC technology demonstration: Build/Assemble/Integrate Phase/Lab Test	2	2018	2	2020
SHARC technology demonstration: Test aknd Evaluation	3	2018	2	2020
SHARC technology demonstration: Program Management	1	2018	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3423 / LOCUST			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3423: LOCUST		0.000	0.000	3.500	3.454	-	3.454	2.960	5.948	7.940	8.103	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

Note
Project 3423 - Low Cost Unmanned Air Systems (UAS) Swarming Technology (LOCUST)

A. Mission Description and Budget Item Justification

The LOCUST demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. LOCUST leverages the BA-3 Innovative Naval Prototype program developing and demonstrating swarming technology. The BA-3 effort is developing both the air vehicle, UAS swarming behaviors, and miniaturized sensor systems. ONR has demonstrated an autonomous system capable of launching 33 UASs in 40 seconds and flying them in a coordinated swarm. This BA-4 effort is trailing the BA-3 demonstration of technologies by a fiscal quarter and then demonstrating the technology in operationally relevant environments with military mission applications.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Title: LOCUST	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: This is a new project in FY2018 - Demonstrate mixed-initiative UAV swarming behaviors, enable the development of payload appropriate CONOPS/TTPs for Many Vehicle/Many Salvo swarms, and provide unmanned system capability to degrade threat Integrated Air Defense Systems (IADS) in support of follow-on manned system operations.		0.000	3.500	3.454	0.000	3.454
FY 2018 Plans: Integrate and demonstrate a scalable system of inexpensive, commoditized Unmanned Aerial Vehicles (UAVs) with swarming behaviors providing two distinct mission capabilities. Phase 1 will develop and demonstrate both air- and ground-launched counter-Improvised Explosive Device (IED) and communications jamming capabilities to support a Marine Corps unit. Phase 2 will develop and demonstrate an unmanned undersea vehicle (UUV)-launched Swarm for counter-Integrated Air Defense Systems (IADS) in support of naval units. This project will demonstrate mixed-initiative UAV swarming behaviors developed by the BA-3 activity, enable the development of payload appropriate CONOPS/TTPs for Many Vehicle/Many Salvo swarms, and provide unmanned system		-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3423 / LOCUST			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
capability to degrade threat IADS in support of follow-on manned system operations. Additional details are available at higher classification levels.						
FY 2019 Base Plans: The Marine Corps Warfighting Laboratory, Air Combat Elements Branch (MCWL ACE) will lead the completion of Phase I integration and test activities to assess functional performance of LOCUST Counter-IED subsystems and components installed on the MV-22 and USMC M-RZR or M-RZR trailer. Conduct system-level experimentation and demonstration of the prototype system. The Center for Naval Analysis will assess system performance for both the air- and ground-based LOCUST Counter-IED system and develop Concepts of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTP) to support future USMC operations.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY2018 to FY2019.						
Accomplishments/Planned Programs Subtotals						
0.000 3.500 3.454						0.000 3.454
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy There are two phases for this non-acquisition project.						
Phase 1 - Marine Corps Warfighting Laboratory (MCWL) Air Combat Element (ACE) will lead the Phase I effort in FY18 & 19. MCWL will procure additional launchers, LOCUST platforms and payloads. MCWL will work with the Common Launch Tube Program of Record to procure the multiple missile Common Launch Tube. MCWL will task NAWC AD to help integrate the launcher system onto the MV-22 and support flight test and flight certification. MCWL will use a supporting Warfare Center to integrate the launcher onto a Marine Corps Program of Record M-RZR or M-RZR trailer. MCWL ACE will closely coordinate with the BA-3 LOCUST program manager to procure the new 6" diameter, additive manufactured, air frame (purchase through BA-3 activity contract). MCWL Experimental Division will define CONOPS/TTPs, the experimental parameters and measures of effectiveness, and operational experiments suitable to apply the capability in a relevant operational environment to evaluate the military utility of the system to a small Marine Corps maneuver element. The Center for Naval Analysis will consolidate the post demonstration report for the systems military utility.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3423 / LOCUST
<p>Phase II -ONR Code 30 will lead a Counter Integrated Air Defense System (IADS) in FY20 -22 to demonstrate the advantages of small swarming UAVs against IADS defenses. ONR Code 30 will work with the Naval Warfare Development Center (NWDC) to develop CONOPS / TTPS for this mission capability and fleet experimentation. NSWC Panama City Division (NSWC PCD) will provide operational and logistics support for the launch and recovery of the vehicles. This phase is delayed for two fiscal years to allow the INP to develop the miniaturized payloads required for an operational demo. This effort will mature the payloads for operational employment.</p>		
E. Performance Metrics MCWL Experimental Division will define CONOPS/TTPs, the experimental parameters and measures of effectiveness, and operational experiments suitable to apply the capability in a relevant operational environment to evaluate the military utility of the system to a small Marine Corps maneuver element.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3423 / LOCUST							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements Analysis	MIPR	Marine Corps Warfighting Lab : Quantico, VA	0.000	0.000		0.500	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Integration and Test	MIPR	Marine Corps Warfighting Lab : Quantico, VA	0.000	0.000		3.000	Jan 2018	0.954	Jan 2019	-		0.954	0.000	3.954	-
Conduct Prototype Experiment	MIPR	Marine Corps Warfighting Lab : Quantica, VA	0.000	0.000		0.000		1.000	Jun 2019	-		1.000	0.000	1.000	-
Assess Technical Performance	C/FP	Center for Naval Analyses : Arlington, VA	0.000	0.000		0.000		0.500	Aug 2019	-		0.500	0.000	0.500	-
CONOP/TTP refinement	C/FP	Center for Naval Analyses : Arlington, VA	0.000	0.000		0.000		1.000	Sep 2019	-		1.000	0.000	1.000	-
Subtotal			0.000	0.000		3.500		3.454		-		3.454	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		3.500		3.454		-		3.454	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech					Project (Number/Name) 3423 / LOCUST					
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3423															
LOCUST Systems Demonstration - Phase I: LOCUST Requirements Analysis															
LOCUST Systems Demonstration - Phase I: LOCUST Integration and Testing															
LOCUST Systems Demonstration - Phase I: Assess technical performance and operational utility															
LOCUST Systems Demonstration - Phase I: Support CONOPS/TTP refinement and transition through User Operational Evaluation System delivery															
LOCUST Systems Demonstration - Phase I: Schedule Detail															
LOCUST Systems Demonstration - Phase II: LOCUST Requirements Analysis															
LOCUST Systems Demonstration - Phase II: Procure Coyote, Launcher and Payloads															
LOCUST Systems Demonstration - Phase II: Coyote, Launcher and Payloads Integration															
LOCUST Systems Demonstration - Phase II: Conduct Experiment															
LOCUST Systems Demonstration - Phase II: Assess technical performance and operational utility															
LOCUST Systems Demonstration - Phase II: Support CONOPS/TTP refinement															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018											
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4								PE 0603382N / Advanced Combat Systems Tech								3423 / LOCUST											
				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
and transition through User Operational Evaluation System delivery								1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3423 / LOCUST	Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3423				
LOCUST Systems Demonstration - Phase I: LOCUST Requirements Analysis	1	2018	2	2018
LOCUST Systems Demonstration - Phase I: LOCUST Integration and Testing	2	2018	3	2019
LOCUST Systems Demonstration - Phase I: Assess technical performance and operational utility	3	2019	4	2019
LOCUST Systems Demonstration - Phase I: Support CONOPS/TTP refinement and transition through User Operational Evaluation System delivery	4	2019	4	2019
LOCUST Systems Demonstration - Phase I: Schedule Detail	4	2019	4	2019
LOCUST Systems Demonstration - Phase II: LOCUST Requirements Analysis	1	2020	2	2020
LOCUST Systems Demonstration - Phase II: Procure Coyote, Launcher and Payloads	2	2020	3	2022
LOCUST Systems Demonstration - Phase II: Coyote, Launcher and Payloads Integration	3	2020	3	2022
LOCUST Systems Demonstration - Phase II: Conduct Experiment	3	2022	3	2022
LOCUST Systems Demonstration - Phase II: Assess technical performance and operational utility	4	2022	4	2022
LOCUST Systems Demonstration - Phase II: Support CONOPS/TTP refinement and transition through User Operational Evaluation System delivery	4	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603382N / Advanced Combat Systems Tech				3424 / Heterogeneous Collaborative Unmanned Systems (HCUS)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3424: <i>Heterogeneous Collaborative Unmanned Systems (HCUS)</i>	0.000	0.000	8.000	7.896	-	7.896	3.922	0.000	0.000	0.000	0.000	19.818	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

This is a new project in FY2018 - Develop integrated, adaptable systems of low cost, heterogeneous unmanned platforms capable of autonomous, collaborative behaviors to execute an operational naval mission.

A. Mission Description and Budget Item Justification

The HCUS demonstration is part of the Department of Defense Third Offset Strategy as one element in the Effector Grid category for small autonomous systems. HCUS provides autonomous, tactical monitoring of an adversary's port-sized littoral area for an extended period of time with capability to apply limited offensive effects on-demand. Vehicles and sensors are intended to be used in contested environments - employing local communications nets, autonomous vehicle behavior, low bandwidth command links and local navigation with no requirement for GPS input.

HCUS systems can be encapsulated and deployed as a single payload, or a small number of payload packages designed for specific missions. The payloads can be carried into theater by various manned or unmanned platforms depending on the degree of stealth required. A week-long project demonstration will simulate covert deployment, operations of autonomous UAVs over the area of interest, data exfiltration to a remote operator, autonomous UAV recharging via USVs and/or UUVs, deployment of unmanned ground sensors for persistent sensing, and remote operator on-demand offensive attack on a simulated target.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<i>Title:</i> Heterogeneous Collaborative Unmanned Systems (HCUS)	0.000	8.000	7.896	0.000	7.896
<i>Articles:</i>	-	-	-	-	-

FY 2018 Plans:

Develop integrated, adaptable systems of low cost, heterogeneous unmanned platforms capable of autonomous, collaborative behaviors to execute an operational naval mission. This project leverages low cost UAV, UUV, and USV advancements in additive manufacturing, advanced autonomy, commercial components, and advanced sensing technologies. HCUS components are rapidly producible, expendable assets employed to minimize risk to manned platforms while increasing mission station time as recovery and return-to-base are not required. Additional details are available at higher classification levels.

FY 2019 Base Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3424 / Heterogeneous Collaborative Unmanned Systems (HCUS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Conduct Government program management and oversight of HCUS development activities. Johns Hopkins University Applied Physics Laboratory, in conjunction with NSWC Dahlgren Division, will complete HCUS system-level design and integration and commence manufacturing of initial HCUS systems.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY2018 to FY2019						
Accomplishments/Planned Programs Subtotals		0.000	8.000	7.896	0.000	7.896
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
NSWCDD will provide Government oversight to the project and develop a multi-domain mission planning system compatible with the Aegis Combat System and Ship Self Defense System (SSDS) capable of tasking the JHU-APL autonomous systems. University Affiliated Research Center John Hopkins University: Applied Physics Laboratory will be responsible for the design and development of additive manufactured quad-copters, UUV launch system for UAV launch, low-profile USVs with commercial sensor systems, and unattended ground sensors (UGS) with a UGS deployment capability, the network backbone and long haul communications back to a combat system or Maritime Operations Center.						
E. Performance Metrics						
Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3424 / Heterogeneous Collaborative Unmanned Systems (HCUS)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
HCUS System Development	MIPR	JHU-APL : Laurel, MD	0.000	0.000		6.000	Oct 2017	4.450	Oct 2018	-		4.450	0.000	10.450	-
HCUS System Development	MIPR	Naval Surface Warfare Center DD : Dahlgren, VA	0.000	0.000		1.500	Oct 2017	2.946	Oct 2018	-		2.946	0.000	4.446	-
Subtotal		0.000	0.000		7.500		7.396		-		7.396	0.000	14.896	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Management and Oversight	MIPR	Naval Surface Warfare Center DD : Dahlgren, VA	0.000	0.000		0.500	Oct 2017	0.500	Oct 2018	-		0.500	0.000	1.000	-
Subtotal		0.000	0.000		0.500		0.500		-		0.500	0.000	1.000	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		8.000		7.896		-		7.896	0.000	15.896	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018	
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
1319 / 4				PE 0603382N / Advanced Combat Systems Tech				3424 / Heterogeneous Collaborative Unmanned Systems (HCUS)								
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023
				1	2	3	4	1	2	3	4	1	2	3	4	1
Proj 3424																
HCUS System Development: Government Management and Oversight																
HCUS System Development: Conduct requirements analysis																
HCUS System Development: Develop Multi-domain planning system																
HCUS System Development: Manufacture systems																
HCUS System Development: Conduct Experiment																
HCUS System Development: Assess technical performance and operational utility																
HCUS System Development: Support CONOPS/TTP refinement and transition through User Operational Evaluation System delivery																

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech Project (Number/Name) 3424 / Heterogeneous Collaborative Unmanned Systems (HCUS)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3424				
HCUS System Development: Government Management and Oversight	1	2018	4	2020
HCUS System Development: Conduct requirements analysis	1	2018	2	2018
HCUS System Development: Develop Multi-domain planning system	1	2018	3	2018
HCUS System Development: Manufacture systems	3	2018	1	2020
HCUS System Development: Conduct Experiment	2	2020	3	2020
HCUS System Development: Assess technical performance and operational utility	3	2020	3	2020
HCUS System Development: Support CONOPS/TTP refinement and transition through User Operational Evaluation System delivery	4	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3437 / EMW/SEWIP/SSEE Accelerator			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3437: EMW/SEWIP/SSEE Accelerator	0.000	0.000	0.000	21.584	-	21.584	23.771	23.773	0.000	0.000	0.000	69.128
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note
This is a new project in FY2019 - Electromagnetic Maneuver Warfare/Surface Electronic Warfare Improvement Program to improve real time Electro-Magnetic Maneuver Warfare operations.

A. Mission Description and Budget Item Justification
The Electromagnetic Maneuver Warfare/Surface Electronic Warfare Improvement Program/Ship's Signals Exploitation Equipment (EMW/SEWIP/SSEE) Accelerator is part of the Department of Defense Third Offset Strategy to improve real time Electro-Magnetic Maneuver Warfare operations. EMW/SEWIP/SSEE Accelerator leverages the S&T Budget Activity (BA)-3 Electro-Magnetic Maneuver Warfare technology developments specifically in cross platform operations. The BA-3 effort is developing high speed sensor and electro-magnetic networking, real time spectrum operations and passive targeting technologies. ONR has demonstrated elements of next generation networking, passive tracking, and cross platform combat system coordination. This BA-4 effort is trailing the BA-3 demonstration of technologies deploying and demonstrating the technology in operationally relevant environments with military mission applications. The deployment will allow the ONR to significantly reduce risk, incorporate early warfighter improvements and test with real world data and scenarios.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: EMW/SEWIP/SSEE Accelerator Articles: Description: EMW/SEWIP/SSEE accelerator builds off of two BA-3 efforts: Surface platform arrays, radios and control software were developed under the Multi-Link CDL System Future Naval Capability and airborne relay were developed within the High Altitude Relay and Routing Future Naval Capability. To date ONR has demonstrated 4-beam CDL surface arrays, radios and controls via land based motion simulators, while the airborne relay functionality has been demonstrated on a P-3 platform in a relevant environment. This is a new project for this PE in FY2019 to develop integrated cross platform active and passive sensing solutions, next generation network and real time spectrum operations.	0.000	0.000	21.584	0.000	21.584
FY 2018 Plans: N/A	-	-	-	-	-
FY 2019 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3437 / EMW/SEWIP/SSEE Accelerator	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Develop and test a multi-beam next generation network allowing significantly more throughputs with low latency designed for cross platform combat system integration, applications to coordinate multiple disparate Electronic Warfare (EW) systems, passive targeting algorithms and real time spectrum operations. This technology accelerator will operationally field 3 shipsets for trials and evaluation.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: This is a new project in FY2019				
Accomplishments/Planned Programs Subtotals		0.000	0.000	21.584
		0.000	0.000	21.584
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy Projects identified for execution under this project number are non-acquisition programs. Each project will develop a project plan to support project execution. Project plans will include a project schedule and technical requirements and objectives to measure project performance. Based on prior BA-3 work prototype contracts are in place and can be used to develop hardware for at sea trials. Software and ship installation will be expected to use a combination of existing shipyard contracts and government field activities.				
E. Performance Metrics Performance metrics are specific to each of the projects funded. All will include measures identified in the objective statements, including completions, successes, terminations, and iterative development prototype cycle times.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3437 / EMW/SEWIP/SSEE Accelerator							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype Development	MIPR	NSWC : various	0.000	0.000		0.000		9.084	Oct 2018	-		9.084	0.000	9.084	-
Prototype Development	PO	NAWC : various	0.000	0.000		0.000		5.000	Oct 2018	-		5.000	0.000	5.000	-
Prototype Development	MIPR	SUPSHIP : Bath Maine	0.000	0.000		0.000		3.000	Oct 2018	-		3.000	0.000	3.000	-
Prototype Development	MIPR	NRL : Washington, DC	0.000	0.000		0.000		4.500	Oct 2018	-		4.500	0.000	4.500	-
Subtotal			0.000	0.000		0.000		21.584		-		21.584	0.000	21.584	N/A
Remarks			NSWC: Prototype development of shipboard next generation networking apertures and EMW cross platform software. NAWC: Prototype development of airborne next generation apertures and networking software. SUPSHIP: Installation and testing of Cross platform EMW accelerator prototype on 2 Navy test vessels. NRL: Installation and testing of Cross platform EMW accelerator prototype on Navy maritime patrol aircraft.												
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		21.584		-		21.584	0.000	21.584	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603382N / Advanced Combat Systems Tech					3437 / EMW/SEWIP/SSEE Accelerator											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3437																					
EMW/SEWIP/SSEE Accelerator: NSWC																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3437 / EMW/SEWIP/SSEE Accelerator	
Schedule Details			
Events by Sub Project		Start	End
<i>Proj 3437</i>		Quarter	Year
EMW/SEWIP/SSEE Accelerator: NSWC		1	2019
		4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603382N / Advanced Combat Systems Tech				3438 / Innovative Naval Prototype (INP) Transition (6.4)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3438: Innovative Naval Prototype (INP) Transition (6.4)	0.000	0.000	0.000	15.059	-	15.059	23.203	30.229	33.524	40.811	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

This is a new project unit (PU) in FY2019. This PU is intended to provide advanced component development and prototyping for selected technologies maturing out of or supporting ONR's Leap Ahead Technology (LA-Tech) and Innovative Naval Prototype (INP) BA3 portfolio.

A. Mission Description and Budget Item Justification

The efforts described in this mission area address the advanced component development and prototype demonstration associated with ONR's Innovative Naval Prototypes (INP) Program and the Leap Ahead Technology (LA-Tech) investments. INP and LA-Tech investments represent game changing technologies with the potential to revolutionize operational concepts. They are disruptive in nature as they would dramatically change the way naval forces fight. INPs and LA-Techs push the imagination of our nation's technical talent to deliver transformational warfighting capabilities. Successful demonstrations are intended to present the Department of the Navy with a programmatic challenge as these new capabilities can lead to the obsolescence of existing capabilities and significant decisions as to the path forward for integrating the new technological capabilities into the warfighting systems of the future.

ONR manages a continuum of INP and LA-Tech development from BA2 to BA3 to BA4. The goal of these BA4 investments is to further mature development and expend efforts necessary to evaluate integrated technologies, representative modes or prototype systems in high fidelity and realistic operating environments. This BA4 investment includes system specific efforts that help expedite technology transition from the laboratory to operational use. Emphasis is on proving component and subsystem maturity prior to integration in major and complex systems and may involve risk reduction initiatives. Projects in this category involve efforts prior to Milestone B and are referred to as advanced component development activities and include technology demonstrations. It is the goal of these projects to achieve Technology Readiness Levels 6 or 7. Successful experimentation and demonstration highlights the viability of new technological capabilities that could be implemented if an acquisition program were to be established to support further development. The portfolio is periodically refreshed through the selection of new INPs and LA-Tech investments as existing ones are completed.

INP, LA-Tech, and supporting technology investments may include R-2 Activities mission areas such as Unmanned and Autonomous Systems, Directed Energy / Electric Weapons, Electromagnetic Maneuver Warfare, Cyber Warfare, and Undersea Warfare.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Unmanned and Autonomous Systems: Advanced ASW sensor array package for medium sized unmanned surface vehicles. Articles:	0.000 -	0.000 -	5.347 -	0.000 -	5.347 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3438 / Innovative Naval Prototype (INP) Transition (6.4)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Description: This is a new project beginning in FY2019 that will develop, integrate, experiment and demonstrate onboard a medium sized unmanned surface vehicle an advanced ASW sensor array package. This package is intended to be used on a platform being developed with Innovative Prototype (INP) and Leap Ahead Technology (LA-Tech) investments. That platform will serve as host for a wide variety of operationally focused capability payloads such as the advance ASW sensor array package being developed in this activity. These warfighter focused packages will enable Unmanned and Autonomous Systems platforms to support the requirement to augment manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains.</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Base Plans: Initiate advanced component hardware and software development and the necessary system-to-hull integration which will lead to a prototype demonstration, in an operational environment, of an advanced ASW sensor array package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: This is a new project beginning in FY2019.</p>						
<p>Title: Unmanned and Autonomous Systems: Advanced ASW kinetic effects package for medium sized unmanned surface vehicle.</p> <p>Articles:</p> <p>Description: This is a new project beginning in FY2019 that will develop, integrate, experiment and demonstrate onboard a medium sized unmanned surface vehicle an advanced ASW kinetic effects package. This capability package is intended to be used on a platform being developed with Innovative Prototype (INP) and Leap Ahead Technology (LA-Tech) investments. That platform will serve as host for a wide variety of operationally focused capability payloads such as the advance ASW kinetic effects package being developed in this activity. These warfighter focused packages will enable Unmanned and Autonomous Systems platforms to support the requirement to augment manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains.</p>		0.000 -	0.000 -	5.712 -	0.000 -	5.712 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3438 / Innovative Naval Prototype (INP) Transition (6.4)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
FY 2018 Plans: N/A				FY 2019 OCO
FY 2019 Base Plans: Initiate advanced component development and the necessary system-to-hull integration which will lead to prototype demonstration, in an operational environment, of an advanced ASW kinetic effects package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle.				FY 2019 Total
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: This is a new project beginning in FY2019.				
Title: Unmanned and Autonomous Systems: Advanced aerial lift package for medium sized unmanned surface vehicle. Articles:	0.000	0.000	4.000	0.000
Description: This is a new project beginning in FY2019 that will develop, integrate, experiment and demonstrate onboard a medium sized unmanned surface vehicle an advanced aerial lift package. This capability package will dramatically increase the range of regard of various sensor payloads that will be carried aloft. It is intended to be used on a platform being developed with Innovative Prototype (INP) and Leap Ahead Technology (LA-Tech) investments. That platform will serve as host for a wide variety of operationally focused capability payloads such as the advance aerial lift package being developed in this activity. These warfighter focused payloads will enable Unmanned and Autonomous Systems platforms to support the requirement to augment manned systems with less expensive, unmanned, fully autonomous systems that can operate in all domains.	-	-	-	-
FY 2018 Plans: N/A				
FY 2019 Base Plans: Initiate advanced component hardware development and the necessary system-to-hull integration which will lead to prototype demonstration, in an operational environment, of an advanced aerial lift package capable of operational use onboard a medium sized autonomous, unmanned surface vehicle.				
FY 2019 OCO Plans:				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3438 / Innovative Naval Prototype (INP) Transition (6.4)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
N/A FY 2018 to FY 2019 Increase/Decrease Statement: This is a new project beginning in FY2019.				FY 2019 OCO
Accomplishments/Planned Programs Subtotals		0.000	0.000	15.059
			0.000	15.059
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy The projects identified for execution are non-acquisition programs. The Office of Naval Research will provide Government oversight to the projects. Each project will develop a project plan to support execution. Project plans will include a schedule and the necessary technical requirements and objectives to measure and evaluate performance. Additionally, each project will be subjected to experimentation then demonstrated in operationally relevant environments to assess their ability to meet warfighter requirements. Project deliverables will include the actual integrated hardware/software prototype systems, test reports, and technical data, necessary to support decision making. These decisions include the transition of technologies to acquisition, further refinement of the technology, or termination and reinvestment of remaining funds to other technologies that add military value.				
E. Performance Metrics In all cases, the technologies being developed within this PE support the Department of the Navy INP and Leap Ahead Programs and are managed at the Office of Naval Research. The primary technological metrics used in this PE involve experiments and tests that demonstrate, in an operationally relevant environment, the proof of concept for the technological capability being developed. Technology development is informed by periodic interaction with Naval warfighters, resource sponsors and the acquisition community. At the lowest level, each project is evaluated against technical and financial milestones on a frequent basis. Annually, each project is reviewed in depth for technical performance and development status by the Chief of Naval Research. Department of the Navy leadership is briefed on the portfolio's status by the Chief of Naval Research.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech				Project (Number/Name) 3438 / Innovative Naval Prototype (INP) Transition (6.4)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced ASW sensor payload	MIPR	NUWC : Newport, Rhode Island	0.000	0.000		0.000		1.308	Oct 2018	-		1.308	Continuing	Continuing	Continuing
Advanced ASW sensor payload	MIPR	JHU-APL : Columbia, Maryland	0.000	0.000		0.000		1.308	Oct 2018	-		1.308	Continuing	Continuing	Continuing
Advanced ASW sensor payload	MIPR	SSC-PAC : San Diego, California	0.000	0.000		0.000		1.308	Oct 2018	-		1.308	Continuing	Continuing	Continuing
Advanced ASW sensor payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000		0.000		1.300	Oct 2018	-		1.300	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	PSU -ARL : State College, Pennsylvania	0.000	0.000		0.000		4.111	Oct 2018	-		4.111	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	SSC-PAC : San Diego, California	0.000	0.000		0.000		0.900	Oct 2018	-		0.900	Continuing	Continuing	Continuing
Advanced ASW kinetic payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000		0.000		0.900	Oct 2018	-		0.900	Continuing	Continuing	Continuing
Advanced aerial lift payload	MIPR	NSWC-CD : Bethesda, Maryland	0.000	0.000		0.000		1.308	Oct 2018	-		1.308	Continuing	Continuing	Continuing
Advanced aerial lift payload	MIPR	NASA Jet Propulsion Lab : Pasedena, California	0.000	0.000		0.000		1.308	Oct 2018	-		1.308	Continuing	Continuing	Continuing
Advanced aerial lift payload	MIPR	SSC-PAC : San Diego, California	0.000	0.000		0.000		1.308	Oct 2018	-		1.308	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		15.059		-		15.059	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		15.059		-		15.059	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603382N / Advanced Combat Systems Tech					3438 / Innovative Naval Prototype (INP) Transition (6.4)											
FY 2017 FY 2018 FY 2019 FY 2020 FY 2021 FY 2022 FY 2023																					
Proj 3438		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Advanced ASW sensor payload for medium sized unmanned surface vehicles		[REDACTED]																			
Advanced ASW kinetic payload for medium sized unmanned surface vehicle		[REDACTED]																			
Advanced aerial lift payload for medium sized unmanned surface vehicle		[REDACTED]																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603382N / Advanced Combat Systems Tech	Project (Number/Name) 3438 / Innovative Naval Prototype (INP) Transition (6.4)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3438				
Advanced ASW sensor payload for medium sized unmanned surface vehicles	1	2019	4	2021
Advanced ASW kinetic payload for medium sized unmanned surface vehicle	1	2019	4	2021
Advanced aerial lift payload for medium sized unmanned surface vehicle	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603502N / Surface & Shallow Water MCM								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	1,301.031	126.761	154.117	62.727	-	62.727	76.052	77.092	86.408	100.631	Continuing	Continuing	
0530: Mine Hunt Systems	280.439	9.469	9.761	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	299.669	
1233: Surface MCM Mid-life Upgrade	156.226	4.073	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	160.299	
1234: Unmanned Surface Vehicle (USV)	46.221	42.069	23.594	28.645	-	28.645	19.915	19.167	18.993	19.404	Continuing	Continuing	
1235: Mine Warfare Planning and Analysis	7.520	8.664	3.139	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.323	
2094: Unmanned Underwater Vehicle	64.860	21.945	60.187	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	146.992	
2131: Assault Breaching System	610.235	19.651	11.623	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	641.509	
2989: Barracuda	0.000	0.000	20.761	31.282	-	31.282	32.237	31.625	37.415	38.227	Continuing	Continuing	
3123: SMCM UUV	135.530	20.890	25.052	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	181.472	
3428: Medium Displacement Unmanned Surface Vehicle (MDUSV)	0.000	0.000	0.000	2.800	-	2.800	23.900	26.300	30.000	43.000	Continuing	Continuing	

Note

FY 2019 and future funding for Projects 0530, 1233, and 1235 have been realigned to PE 0604127N; Project 2094 to PE 0604031N; Project 2131 to PE 0604126N and Project 3123 to 0604028N. Project 0530 realigned from PE 0603502N starting in FY 2019 included a \$1.192 million reduction to account for the availability of prior year execution balances.

The FY 2019 funding request for remaining projects was reduced by \$4.600 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

This program element provides resources for development of mine countermeasure systems to provide minehunting, minesweeping, and neutralization to counter known and projected mine threats. The mine countermeasures systems provide mobile, quick reaction forces capable of land or sea-based minehunting and minesweeping operations worldwide. Resources are for developing and deploying advanced mine-hunting and minesweeping systems and the intelligence and oceanographic capabilities that will enable mine warfare superiority. Tactics and techniques used vary across a diversity of environments and a diversity of threats, including both asymmetric and emerging. Resources provide for systems and support of mine warfare systems, maritime systems, and expeditionary systems to allow for continuous

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity	R-1 Program Element (Number/Name)						
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0603502N / Surface & Shallow Water MCM						
operations of the Navy's warships and support vessels, other military vessels, and commercial vessels. Core capabilities include forward presence, deterrence, sea control, power projection, maritime security, humanitarian assistance and disaster response to maintain freedom of the seas. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, reducing or eliminating post-mission analysis detect, classify, identify, decide time, improving neutralization time, improving network communications, automatic target recognition, and achieving in-stride detect-to-engage capability. Concept of operations includes development of cooperative, unmanned, modular systems; the establishment of a capable networked command and control systems; and standing up an accurate and interactive environmental system with the ability to form and disseminate a Common Environmental Picture. Efforts benefit the Mine Countermeasure (MCM) force by transforming the Navy from the platform-centered legacy set of systems to a capability-centered force that is distributed, networked, and able to provide unique maritime influence and access across the entire maritime domain. Efforts also include undersea domain efforts associated with the Snakehead Large Displacement UUV (LDUUV), as well as efforts for the new Medium Displacement USV starting in FY19 which will serve as the unmanned surface vessel portion of the Navy's Future Surface Combatant (FSC) strategy.							
The Surface Mine Countermeasures (SMCM) programs are in general platform independent and will provide detection, classification, localization, identification, neutralization, and influence clearance capabilities. Programs develop: (1) Unmanned minehunting capability for surface platforms; (2) the integration and improvement of new and existing systems (3) support for systems which detect, localize, classify, identify, and neutralize all mine types across MCM Avenger Class and other platforms; (4) systems for neutralizing mines and light obstacles through the entire water column to include deep water, open water, shallow water, very shallow water, surf zones, and beach landing craft zones in support of operations; (5) the integration of Unmanned Undersea Vehicles (UUVs) to meet Undersea Surveillance capabilities as well as other prioritized and enduring capabilities, requirements and gaps; (6) integrate hardware for experimental testing related to surface ship, aircraft, and other cross platform applications; and (7) provide for the future unmanned portion of the FSC strategy.							
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
Previous President's Budget	165.775	154.117	233.873	-	233.873		
Current President's Budget	126.761	154.117	62.727	-	62.727		
Total Adjustments	-39.014	0.000	-171.146	-	-171.146		
• Congressional General Reductions	-	-					
• Congressional Directed Reductions	-	-					
• Congressional Rescissions	-	-					
• Congressional Adds	-	-					
• Congressional Directed Transfers	-	-					
• Reprogrammings	9.680	0.000					
• SBIR/STTR Transfer	-3.694	0.000					
• Program Adjustments	0.000	0.000	-162.501	-	-162.501		
• Rate/Misc Adjustments	0.000	0.000	-8.645	-	-8.645		
• Congressional Directed Reductions	-45.000	-	-	-	-		
Adjustments							

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>
<p><u>Change Summary Explanation</u></p>	
Program Adjustments:	
FY17 -\$39,014K Total adjustments; Congressional Reductions: -\$2,000K LDUUV Support Excess Growth, -\$43,000K LDUUV - Continue Risk Reduction & Technology maturation effort only, -\$3,694K SBIR, +\$9,680K FY17 JUNE ATR Prior Approval Request.	
FY18 No Change	
FY19 -\$171,146K Total adjustments; Program adjustments: -\$145,106K realignment to new Program Elements; -\$20,432K realignment of UUV, +\$12,000K MCM Acceleration, -\$10,000K past execution and congressional marks, +\$2,800K Medium Displacement USV (MDUSV), +\$2,500K synthetic trainer, -\$3,090K ABS Excess growth, -\$1,173K MEDAL unjustified growth; Other Rate Adjustments: -\$5,792K under execution reduction, -\$853K miscellaneous adjustments.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 0530 / Mine Hunt Systems			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0530: Mine Hunt Systems	280.439	9.469	9.761	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	299.669
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N. Project realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

This project contains resources for systems, subsystems, and sensors integrated for use with the new program MCM Unmanned Surface Vehicle (MCM USV) for mine detection, classification, localization, and identification in support of mine neutralization, and influence clearance capabilities. Research, development, test, and evaluation efforts are for increasing capability by decreasing time required to conduct Mine Countermeasures (MCM) operations, ensuring low risk to naval and commercial vessels, and removing the man from the minefield. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, and reducing post-mission analysis for detection, classification, and identification.

The AN/AQS-20 is a mine hunting and identification system with sensors housed in an underwater towed body. The sensors are designated for the detection, classification and localization of bottom, close-tethered, and volume targets, and also for the identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package or can be deployed from other Vessels of Opportunity (VOO). The MCM USV is the tow platform for the AN/AQS-20.

The AN/AQS-20 Block 1 (the AQS-20A) is undergoing a Pre-Planned Product Improvement (P3I) program to upgrade the Forward Looking Sonar (FLS) and Side-Looking Sonars (SLS) to improve Probability of Classifying a Mine-like object as a Mine, reduce False Classification, and improve Depth Localization performance to meet Block 2 (the AQS-20C) performance. The Forward Looking Sonar is being replaced with a new High Frequency Wideband Forward Looking Sonar (WBFLS) design. The SLS is being replaced with a new Multifunction SLS with Synthetic Aperture Sonar (SAS) capability, as well as, improved signal processing and Signal to Noise Ratio. The Block 1 P3I program began in FY 2012 and completed in FY 2017. Award and management for Block 2 production units began in FY 2014 (the AQS-20C). Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts continue beyond FY2023.

In FY 2017, the AN/AQS-20 Block 2 P3I program conducted Synthetic Aperture Sonar (SAS) development and test. The AN/AQS-20 program also completed the initial build of algorithms and software components to be used for post mission analysis software tools for the AN/AQS-20 Block 2 (the AQS-20C). The Block 2 P3I program began in FY 2017 and continues beyond FY 2023. Development and Material Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts will continue beyond FY2023.

In FY 2018, the AN/AQS-20 Block 2 program (AQS-20C) is scheduled to conduct Developmental Testing (originally scheduled to start at end of FY17), initiate MCM USV integration, and initiation of MCM improvements for post mission analysis tools in support of Net-centric Sensor Analysis for Mine Warfare (NSAM) integration for

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 0530 / Mine Hunt Systems							
the Fleet Operators. The net effect of these tools combined with the more powerful AN/AQS-20 Block 2 sensors will be improved classification of mines, more accurate vertical localization, reduced false calls, and improved area clearance rate sustained. Improvements also include the collection and ingestion of in-situ environmental data used for mission planning to configure the sensor which optimizes sensor performance during missions. Development of these tools begins in FY 2018 and will continue through FY 2021.									
In FY 2019 the project is realigned to Program Element 0604127N									
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									
Title: AN/AQS-20 Product Development	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
- Continue SAS Acoustic mine recognition development. - Continue SAS Acoustic mine recognition ECP. - Initiate algorithm development for AN/AQS-20 Block 2 PMA Improvements including NSAM integration. - Complete development of the Mission Planning Optimizer used to configure the AN/AQS-20 Block 2 sensors. - Initiate AN/AQS-20 Block 2 improvements in support of MCM USV integration. - Complete initial Post Mission Analysis Software for AN/AQS-20 Block 2 (Q-20C) Multi-Function SLS and EOID. - Correct deficiencies identified during testing.	-	2.900	3.036	0.000	0.000	0.000			
FY 2018 Plans: FY 2019 funding in Program Element (PE) 0604127N.		-	-	-	-	-			
FY 2019 Base Plans: N/A									
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.									
Title: AN/AQS-20 Support	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
- Provide ongoing technical and management support to AN/AQS-20. - Continue to conduct test minefield maintenance. - Initiate AN/AQS-20 Block 2 Mission Planning and Post Mission Analysis Concept of Employment development. - Update Information Assurance Plans in support of AN/AQS-20 Block 2 (Q-20C). - Complete Depot Maintenance (Overhaul) Plan.	-	2.300	0.900	0.000	0.000	0.000			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 0530 / Mine Hunt Systems		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Complete Technical Insertion Plan. FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604127N. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.					
Title: AN/AQS-20 Test and Evaluation FY 2018 Plans: - Complete AN/AQS-20 Block 2 DT. - Conduct AN/AQS-20 Block 2 PMA Data Collection with test mines under various conditions. - Initiate SAS Acoustic recognition Testing. FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604127N. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.	Articles: 3.000 - -	5.325 - -	0.000 - -	0.000 - -	0.000 - -
Title: AN/AQS-20 Management Services FY 2018 Plans: - Provide planning and management for the AN/AQS-20 program. - Begin update of acquisition documentation in support of Full Rate Production (FRP) Decision Review. - Continue to provide Program Office travel support. FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604127N. FY 2019 OCO Plans:	Articles: 1.269 - -	0.500 - -	0.000 - -	0.000 - -	0.000 - -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018									
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM					Project (Number/Name) 0530 / Mine Hunt Systems										
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
N/A																			
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.																			
Accomplishments/Planned Programs Subtotals										9.469	9.761	0.000	0.000	0.000					
C. Other Program Funding Summary (\$ in Millions)																			
Line Item		FY 2017	FY 2018	FY 2019	Base	FY 2019	OCO	FY 2019	Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• OPN/1601: LCS MCM Mission Modules		29.724	55.870	124.147	-	124.147			204.324	245.108	227.068	234.109	1,421.551	2,691.282					
• RDTEN/0604127N/0530: Mine Hunt Systems		0.000	0.000	7.579	-	7.579			8.861	7.234	4.447	4.548	Continuing	Continuing					
Remarks																			
OPN/1601 funding line accounts for several programs, of which the AN/AQS-20 program is only a portion.																			
D. Acquisition Strategy																			
AN/AQS-20 LRIP procurement continued following Block 2 (AQS-20C units) competitive contract award in FY 2014. Continue to meet MCM MP requirements to support production of Block 2 units.																			
E. Performance Metrics																			
AN/AQS-20 - Successfully complete Block 2 DT in FY 2018.																			

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 0530 / Mine Hunt Systems							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Hardware/Software Development Q-20 on the H-53	SS/CPIF	Raytheon : Portsmouth, RI	31.120	0.000		0.000		0.000		-		0.000	0.000	31.120	-
AN/AQS-20 Hardware/Software Development Q-20A on the H-60	C/CPFF	Raytheon : Portsmouth, RI	60.150	0.000		0.000		0.000		-		0.000	0.000	60.150	-
AN/AQS-20 Hardware/Software Development	WR	NSWC, PC : Panama City FL	14.578	0.000		0.000		0.000		-		0.000	0.000	14.578	-
AN/AQS-2A Hardware/Software Development	C/FP	Northrop Grumman : Melbourne, FL	4.572	0.000		0.000		0.000		-		0.000	0.000	4.572	-
AN/AQS-20 P3I	C/CPFF	Raytheon : Portsmouth, RI	17.391	1.100	Nov 2016	0.509	Nov 2018	0.000		-		0.000	0.000	19.000	-
AN/AQS-20 P3I	C/CPFF	ARL/UT : Austin, TX	9.017	0.600	Dec 2016	0.000		0.000		-		0.000	0.000	9.617	-
AN/AQS-20 P3I	WR	NSWC, PC : Panama City FL	5.054	1.200	Oct 2016	0.000		0.000		-		0.000	0.000	6.254	-
AN/AQS-20 Block 2 PMA	WR	NSWC, PC : Panama City FL	0.000	0.000		1.099	Nov 2017	0.000		-		0.000	0.000	1.099	-
AN/AQS-20 Block 2 PMA	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		1.128	Feb 2018	0.000		-		0.000	0.000	1.128	-
AN/AQS-20 Block 2 Intergration	C/CPFF	Lockhead Martin : Not Specified	0.000	0.000		0.300	Nov 2017	0.000		-		0.000	0.000	0.300	-
AN/AQS-20 Materiel Reliability ECP Development	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
AN/AQS-20 P3I	WR	Naval Research Lab : Stennis Space Center, MS	0.225	0.000		0.000		0.000		-		0.000	0.000	0.225	-
Subtotal			142.107	2.900		3.036		0.000		-		0.000	0.000	148.043	N/A
Remarks															
FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 0530 / Mine Hunt Systems							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Engineering Services	WR	NSWC, PC : Panama City, FL	31.976	0.410	Oct 2016	0.135	Nov 2017	0.000		-		0.000	0.000	32.521	-
AN/AQS-20 Engineering Services	C/CPFF	Raytheon : Portsmouth, RI	4.486	0.200	Oct 2016	0.200	Dec 2017	0.000		-		0.000	0.000	4.886	-
AN/AQS-20 Engineering Services	Various	Various : Various	54.018	0.000		0.000		0.000		-		0.000	0.000	54.018	-
AN/AQS-20 Engineering Services 2	SS/CPIF	Raytheon : Portsmouth, RI	3.464	0.000		0.000		0.000		-		0.000	0.000	3.464	-
AN/AQS-20 ILS Function	WR	NSWC, PC : Panama City FL	7.618	1.165	Oct 2016	0.200	Nov 2017	0.000		-		0.000	0.000	8.983	-
AN/AQS-20 ILS Function	SS/CPIF	Raytheon : Portsmouth, RI	1.546	0.000		0.000		0.000		-		0.000	0.000	1.546	-
AN/AQS-20 ILS Function	Various	Various : Various	0.981	0.000		0.000		0.000		-		0.000	0.000	0.981	-
AN/AQS-20 Engineering Services	WR	NSWC/CD : Carderock, MD	0.660	0.165	Oct 2016	0.000		0.000		-		0.000	0.000	0.825	-
AN/AQS-20 Engineering Services	WR	NSWC/NPT : Newport, RI	0.355	0.360	Oct 2016	0.365	Oct 2017	0.000		-		0.000	0.000	1.080	-
Subtotal		105.104	2.300		0.900		0.000		-			0.000	0.000	108.304	N/A

Remarks

FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 T&E Functions	WR	COTF : Norfolk, VA	0.000	0.230	Nov 2016	0.200	Feb 2018	0.000		-		0.000	0.000	0.430	-
AN/AQS-20 T&E Functions	WR	NSWC, PC : Panama City FL	19.880	2.370	Oct 2016	4.525	Feb 2018	0.000		-		0.000	0.000	26.775	-
AN/AQS-20 T&E Functions	C/CPFF	Raytheon : Portsmouth, RI	4.134	0.400	Apr 2017	0.600	Feb 2018	0.000		-		0.000	0.000	5.134	-
AN/AQS-20 T&E Functions	Various	Various : Various	1.583	0.000		0.000		0.000		-		0.000	0.000	1.583	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 0530 / Mine Hunt Systems							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 T&E Functions	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal		25.597	3.000		5.325		0.000		-		0.000	0.000	33.922	N/A	

Remarks
FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.

COTF - Naval Command Operational Test and Evaluation Force

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Management Services	TBD	Various : Various	6.992	1.229	Dec 2016	0.470	Dec 2017	0.000		-		0.000	0.000	8.691	-
AN/AQS-20 Travel	TBD	Various : Various	0.627	0.040	Mar 2017	0.030	Mar 2018	0.000		-		0.000	0.000	0.697	-
AN/AQS-20 Acquisition Workforce Fund	Various	Various : Various	0.012	0.000		0.000		0.000		-		0.000	0.000	0.012	-
Subtotal		7.631	1.269		0.500		0.000		-		0.000	0.000	9.400	N/A	

Remarks
FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.

		Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		280.439	9.469		9.761		0.000		-		0.000	0.000	299.669	N/A

Remarks
FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

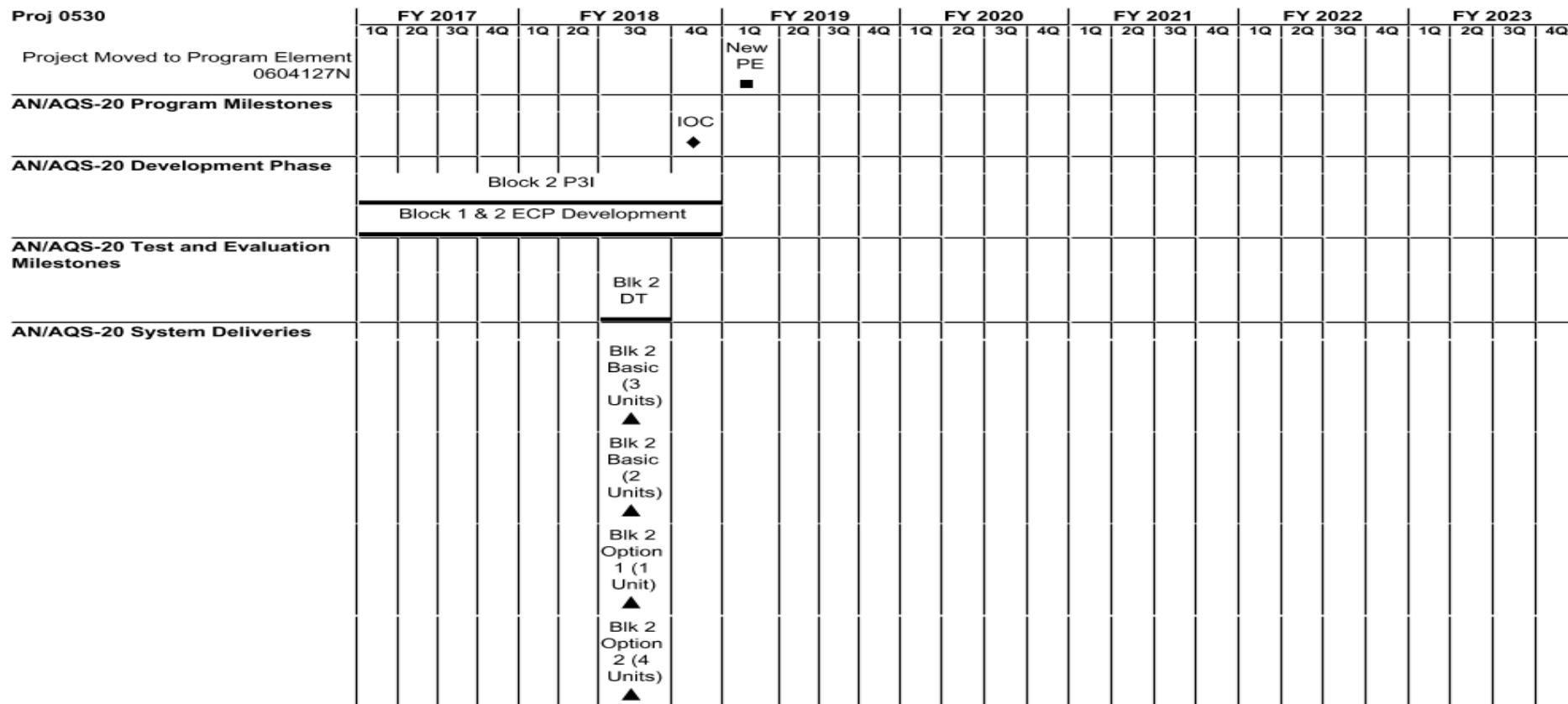
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603502N / Surface & Shallow Water
MCM

Project (Number/Name)
0530 / *Mine Hunt Systems*



2019PB - 0603502N - 0530

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 0530 / Mine Hunt Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0530				
Project Moved to Program Element 0604127N:	1	2019	1	2019
AN/AQS-20 Program Milestones: Initial Operational Capability (IOC)	4	2018	4	2018
AN/AQS-20 Development Phase: AN/AQS-20 Block 2 P3I	1	2017	4	2018
AN/AQS-20 Development Phase: AN/AQS-20 Materiel Reliability, Obsolescence, and Performance ECP Development (Block 1 & 2)	1	2017	4	2018
AN/AQS-20 Test and Evaluation Milestones: AN/AQS-20 Test Events Block 2 DT	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Basic Award Systems (3 Units)	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Basic Award Systems (2 Units)	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Option 1 Award System (1 Unit)	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Option 2 Award Systems (4 Units)	3	2018	3	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1233: Surface MCM Mid-life Upgrade	156.226	4.073	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	160.299
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for Project 1233 is in Program Element (PE) 0604127N. Project realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

This project provides resources for development, improvement and integration of MCM systems. A description of the major planned programs include the following:

1) AN/SQQ-32(V)4 High-Frequency, Wide Band (HFWB) is a technology upgrade to the AN/SQQ-32 Towed Body which will incorporate HFWB technology into the detection sonar to address performance deficiencies against new mine threats in the littorals. This upgrade will be installed on MCM-1 Class ships with the AN/SQQ-32(V)3 and will develop new transducer modules, fiber optic cable and modify topside processing and display software. 2) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander. 3) Develop and implement Mine Countermeasures Commander's Estimate of the Situation (MCM CES). 4) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a ship of opportunity; 5) The Multi-Function USV replaces the sweep system with a minehunting sensor. The capability leverages off a common USV to conduct minehunting missions. 6) AN/SLQ-60 Mine Neutralization System (MNS) Seafox on the MCM Class ships. MNS is the replacement to the existing AN/SLQ-48 Mine Neutralization System. 7) SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: HFWB/PRODUCT DEVELOPMENT: FY 2018 Plans: N/A	0.312	0.000	0.000	0.000	0.000
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.						
Title: HFWB/SUPPORT: FY 2018 Plans: N/A FY 2019 Base Plans: N/A FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.	Articles: - - - - -	0.150	0.000	0.000	0.000	0.000
Title: HFWB/TEST AND EVALUATION: FY 2018 Plans: N/A FY 2019 Base Plans: N/A FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.		0.125	0.000	0.000	0.000	0.000
Title: SSQ-94 MCM Trainer Development FY 2018 Plans:	Articles: - - - -	3.486	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM					Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
								FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A												
FY 2019 Base Plans: N/A												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.												
Accomplishments/Planned Programs Subtotals								4.073	0.000	0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/2622: Minesweeping System Replacement	26.764	31.531	35.709	-	35.709	55.949	51.338	34.007	16.753	Continuing	Continuing	
Remarks The above funding line accounts for several programs, of which the mine sweeping system replacement programs are only a portion.												
D. Acquisition Strategy HFWB - Naval Surface Warfare Center, Panama City (NSWC, PC) and ARL UT designed and developed the HFWB upgrade to the AN/SQQ-32. Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Mine Warfare and Anti-Submarine Command (NMAWC)). The fleet inputs are then consolidated by COMINEWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software. MEDAL development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCEnet requirements. Acquisition strategy for Mine Countermeasures Commander's Estimate of the situation (MCM CES) is to deliver the software module within MEDAL builds by implementing the CES framework into the MEDAL software. SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade
E. Performance Metrics SSQ-94 Trainer upgrade completion		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MNS Development	Various	TBD : TBD	22.455	0.000		0.000		0.000		-		0.000	0.000	22.455	-
SSQ-94 Trainer	WR	NSWC, PC : NSWC, PC	12.858	3.486	Nov 2016	0.000		0.000		-		0.000	0.000	16.344	-
BSP: Develop Bottom Sediment Classifier	WR	NRL : WASHINGTON, DC	0.258	0.000		0.000		0.000		-		0.000	0.000	0.258	-
Systems Engineering and Integration	WR	NSWC, PC : PANAMA CITY, FL	0.306	0.000		0.000		0.000		-		0.000	0.000	0.306	-
System Development 1	WR	NSWC, PC : SAN DIEGO, CA	0.373	0.000		0.000		0.000		-		0.000	0.000	0.373	-
Systems Engineering 2	WR	NSWC, PC : PANAMA CITY, FL	2.915	0.000		0.000		0.000		-		0.000	0.000	2.915	-
Systems Engineering 3 MCM CES	WR	NSWC, PC : PANAMA CITY, FL	1.633	0.000		0.000		0.000		-		0.000	0.000	1.633	-
HFWB: Primary Hardware Development 1	C/CPAF	ARL UT : TEXAS	15.511	0.000		0.000		0.000		-		0.000	0.000	15.511	-
Primary Hardware Development 2	WR	ARL-UT : AUSTIN, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
HFWB: Tow Cable Development	C/CPAF	ARL UT : TEXAS	1.399	0.000		0.000		0.000		-		0.000	0.000	1.399	-
HFWB: Ship Integration	WR	NSWC, PC : PANAMA CITY, FL	1.697	0.000		0.000		0.000		-		0.000	0.000	1.697	-
HFWB: SYSTEM ENGINEER	C/CPAF	ARL UT : TEXAS	8.753	0.312	May 2017	0.000		0.000		-		0.000	0.000	9.065	-
Software Development MEDAL EA	C/CPFF	SAIC : McLean, VA	41.180	0.000		0.000		0.000		-		0.000	0.000	41.180	-
Subtotal			109.338	3.798		0.000		0.000		-		0.000	0.000	113.136	N/A

Remarks

FY 2019 and future funding realigned to PE 0604127N.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade								
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Develop Logistics Products	WR	NSWC, PC : PANAMA CITY, FL	0.243	0.000		0.000		0.000		-		0.000	0.000	0.243	-	
Software Development 1	C/CPFF	SAIC : McLean, VA	0.350	0.000		0.000		0.000		-		0.000	0.000	0.350	-	
Software Development 2	C/CPFF	SAIC : McLean, Va	0.914	0.000		0.000		0.000		-		0.000	0.000	0.914	-	
HFWB Software Development	C/CPIAF	ARL-UT : TEXAS	8.300	0.150	May 2017	0.000		0.000		-		0.000	0.000	8.450	-	
HFWB Integrated Logistics Support	WR	NSWC, PC : PANAMA CITY, FL	2.765	0.000		0.000		0.000		-		0.000	0.000	2.765	-	
Software Engineering 1 MCM CES	WR	NSWC, PC : PANAMA CITY, FL	1.517	0.000		0.000		0.000		-		0.000	0.000	1.517	-	
Software Engineering 2 MEDAL	WR	NSWC, PC : PANAMA CITY, FL	2.458	0.000		0.000		0.000		-		0.000	0.000	2.458	-	
Subtotal		16.547	0.150		0.000		0.000		0.000		-		0.000	0.000	16.697	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.																
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MEDAL Test and Evaluation	C/FP	SAIC : McLean, VA	7.636	0.000		0.000		0.000		-		0.000	0.000	7.636	-	
MCM CES Test and Evaluation 1	C/CPIAF	VARIOUS : VARIOUS	1.782	0.000		0.000		0.000		-		0.000	0.000	1.782	-	
HFWB: Developmental Test and Evaluation	C/CPIAF	ARL-UT : TEXAS	5.800	0.125	May 2017	0.000		0.000		-		0.000	0.000	5.925	-	
Test and Evaluation 2	C/CPIAF	VARIOUS : VARIOUS	5.204	0.000		0.000		0.000		-		0.000	0.000	5.204	-	
Subtotal		20.422	0.125		0.000		0.000		0.000		-		0.000	0.000	20.547	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks FY 2019 and future funding realigned to PE 0604127N.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support 1	C/CPFF	CACI : WASHINGTON, DC	0.263	0.000		0.000		0.000		-		0.000	0.000	0.263	-
Travel 1	WR	NAVSEA : WNY, DC	0.084	0.000		0.000		0.000		-		0.000	0.000	0.084	-
Government Engineering Support1	WR	NSWC, PC : PANAMA CITY, FL	0.325	0.000		0.000		0.000		-		0.000	0.000	0.325	-
MEDAL Program Management Support 2	Various	VARIOUS : VARIOUS	2.827	0.000		0.000		0.000		-		0.000	0.000	2.827	-
SBIR Assessment 2	Various	VARIOUS : VARIOUS	0.019	0.000		0.000		0.000		-		0.000	0.000	0.019	-
Program Management Support 3	C/CPFF	CACI : WASHINGTON, DC	1.341	0.000		0.000		0.000		-		0.000	0.000	1.341	-
Program Management Support 4	C/CPFF	CACI : WASHINGTON, DC	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Government Engineering Support3	WR	NSWC, PC : PANAMA CITY, FL	0.090	0.000		0.000		0.000		-		0.000	0.000	0.090	-
Travel 3	C/CPAF	NAVSEA : WNY, DC	0.256	0.000		0.000		0.000		-		0.000	0.000	0.256	-
Program Management Support 5	C/CPFF	CACI : WASHINGTON, DC	0.167	0.000		0.000		0.000		-		0.000	0.000	0.167	-
Government Engineering Support4	WR	NSWC, PC : PANAMA CITY, FL	0.010	0.000		0.000		0.000		-		0.000	0.000	0.010	-
Travel4	C/CPAF	NSWC, PC : PANAMA CITY, FL	0.069	0.000		0.000		0.000		-		0.000	0.000	0.069	-
HFWB: Program Management Support 6	C/CPAF	VARIOUS : VARIOUS	1.442	0.000		0.000		0.000		-		0.000	0.000	1.442	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
HFWB: Government Engineering Support5	WR	NSWC, PC : PANAMA CITY, FL	0.750	0.000		0.000		0.000		-		0.000	0.000	0.750	-
HFWB: Travel 5	C/CPAF	NAVSEA : WNY, DC	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Government Engineering Support6	WR	NSWC, PC : PANAMA CITY, FL	1.352	0.000		0.000		0.000		-		0.000	0.000	1.352	-
Travel 6	C/CPAF	NAVSEA : WNY, DC	0.238	0.000		0.000		0.000		-		0.000	0.000	0.238	-
SBIR Assessment 6	Various	VARIOUS : VARIOUS	0.054	0.000		0.000		0.000		-		0.000	0.000	0.054	-
Program Management Support 7	C/CPAF	VARIOUS : VARIOUS	0.350	0.000		0.000		0.000		-		0.000	0.000	0.350	-
Acquisition Workforce Fund	Various	VARIOUS : VARIOUS	0.122	0.000		0.000		0.000		-		0.000	0.000	0.122	-
Subtotal			9.919	0.000		0.000		0.000		-		0.000	0.000	9.919	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			156.226	4.073		0.000		0.000		-		0.000	0.000	160.299	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																			Date: February 2018											
Appropriation/Budget Activity 1319 / 4								R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM								Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade														
HFWB	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
System Development	P3I	P3I																												
Deliveries	Installation				HFWB Installation																									

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																			Date: February 2018												
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)															
1319 / 4				PE 0603502N / Surface & Shallow Water MCM								1233 / Surface MCM Mid-life Upgrade																			
SSQ-94 Trainer				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
				1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q				
System Development																															
	Engineering and Manufacturing Development		Engineering and Manufacturing Development																												
Test and Evaluation																															
	T&E		SSQ-94 T&E																												
Production Milestones																															
	Install		Build 1 Installs										Build 2 Installs																		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
HFWB				
Schedule Detail	1	2019	1	2019
System Development: P3I: P3I Development	1	2017	4	2017
Deliveries: Installation: Installation	1	2017	4	2017
SSQ-94 Trainer				
System Development: Engineering and Manufacturing Development: Engineering and Manufacturing Development	1	2017	4	2017
Test and Evaluation: T&E: T&E	1	2017	4	2017
Production Milestones: Install: Build 1 Installs	1	2017	4	2017
Production Milestones: Install: Build 2/3 Installs	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603502N / Surface & Shallow Water MCM				1234 / Unmanned Surface Vehicle (USV)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1234: <i>Unmanned Surface Vehicle (USV)</i>	46.221	42.069	23.594	28.645	-	28.645	19.915	19.167	18.993	19.404	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

The FY 2019 funding request was reduced by \$4.600 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

This project provides resources for development, improvement and integration of Unmanned Surface Vehicle (USV) Mine Countermeasure systems. A description of the major planned programs include the following:

1) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a Vessel of Opportunity (VOO);

2) MineHunting USVs (MHUs) were delivered in FY14 to 5th Fleet in response to an Urgent Operational Need (UON) from Naval Forces Central Command concerning Mine Countermeasure (MCM) capacity and capability gaps. Four systems (referred to as MHUs 1-4) were provided to Combined Task Force (CTF) 52 to conduct Minehunting Operations.

Each MHU consists of a USMI Naval Special Warfare (NSW) 11-meter Rigid Hull Inflatable Boat (RHIB), which was converted to an Unmanned Surface Vessel by Naval Undersea Warfare Center Division Newport, and tows a Northrop Grumman AQS-24B Minehunting sonar. The systems are controlled from a Command and Control (C2) container located on either an underway host platform or on pier-side. MHUs 1-4 are currently in sustainment and will support CTF52 until MCM Mission Packages are deployed to C5F AOR. In FY16-17, Speed to Fleet (S2F) funding supported the design and fabrication of an additional minehunting asset (referred to as "MHU 5") based on the MCM USV craft and integrating the AQS-24B. Beyond FY17, all future efforts with MHU 5 will be within the MCM USV with Payloads program.

3) The Mine Countermeasures Unmanned Surface Vehicle (MCM USV)[previous term CUSV] with Payloads program leverages the USV from the UISS Program of Record and adds a modular mission capability through the addition of multiple payloads. MCM USV w/AQS-20C integrates the existing AQS-20C mine-hunting sonar. MCM USV w/AQS-24B continues the Minehunting efforts of MHU 5. In FY19 the MCM USV with Payloads program will begin initial design efforts to support integration with a Mine Neutralization capability (Barracuda). Minesweeping payloads will be subsumed by the MCM USV with Payloads PoR upon the completion of UISS LRIPs.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: UISS Product Development	9.355	0.700	1.000	0.000	1.000

Articles:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Support completion of CT, UISS DT and Operational Assessment (OA) in support of Milestone C in 4QFY2018. During DT, identify any design changes that are needed in support of follow on production efforts. Complete the UISS EDM Technical Data Package (TDP) after completion of UISS EDM Developmental Testing (DT) and Operational Assessment (OA). Evaluate tech refresh product improvements.						
FY 2019 Base Plans: Develop ECPs for EDM and LRIP units. Conduct system engineering efforts in support of program and test efforts.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increase to support ECPs.						
Title: UISS Support	Articles:	1.790	0.500	1.250	0.000	1.250
FY 2018 Plans: Engineering, management, and integrated logistics support for Technical Data Package (TDP),conduct Functional Configuration Audit (FCA), and Production Readiness Review (PRR). Support a Milestone C decision in 4Q FY 2018, preparations for IOC in FY19, and start of the development of proposal for Full Rate Production (FRP).	Articles:	-	-	-	-	-
FY 2019 Base Plans: Engineering, management and logistics support for IOC in 4QFY19, preps for IOT&E and ongoing LRIP efforts. Continue development of FRP documentation to release RFP in late FY19.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding increase to support IOT&E.						
Title: UISS Test and Evaluation	Articles:	1.781	0.974	1.625	0.000	1.625

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Complete DT and conduct Operational Assessment (OA) of UISS EDM. Conduct LCS integration efforts for risk reduction and system verification (provided LCS ship schedule supports) in preparation for OA.						
FY 2019 Base Plans: Conduct UISS system level IOT&E in support of FRP decision planned for FY20.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increase for IOT&E.						
Title: UISS Management	Articles:	0.355	0.120	0.131	0.000	0.131
FY 2018 Plans: Oversee ongoing contractor efforts. Manage efforts to get to Milestone C decision in 4Q FY 2018, start preparations for IOC in FY19, and start of the development of proposal for Full Rate Production (FRP)). Manage award of FY18 Low Rate Initial Production (LRIP) option.		-	-	-	-	-
FY 2019 Base Plans: Oversee ongoing contractor efforts. Manage FRP RFP release and proposal evaluation.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increase to support IOT&E.						
Title: MHU Product Development	Articles:	8.186	0.000	0.000	0.000	0.000
FY 2018 Plans: N/A		-	-	-	-	-
FY 2019 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2019 OCO Plans: N/A						
Title: MHU Support FY 2018 Plans: Provide program management, engineering and logistics support for product improvements to forward-deployed MHU 1-4 USVs and Command and Control (C2) Station. Tasking will maintain Cybersecurity compliance of system via a software baseline update developed and installed on fielded USVs and C2 container.	Articles: - FY 2019 Base Plans: Provide program management, engineering and logistics support for product improvements to forward-deployed MHU 1-4 USVs and Command and Control (C2) Station. Tasking will produce ECPs to implement increased capabilities to meet MCMRON-5 needs during MHU Overhaul, as well as maintain Cybersecurity compliance of system via a software baseline update developed and installed on fielded USVs and C2 container.	1.414	0.300	0.900	0.000	0.900
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase due to ECP development						
Title: MCM USV w/ Payloads Product Development FY 2018 Plans: Complete fabrication of MCM USV crafts and associated sonar D&R systems. Begin system level integration of initial MCM USV w/AQS-20C minehunting sonar. Begin system level integration of initial MCM USV w/AQS-24B minehunting sonar (previously MHU 5). Complete initial design & software development efforts for craft and payload integration, command & control, and operations. Complete fabrication of sonar Deploy and Retrieve systems for MCM USV. Conduct initial system level testing. Prepare to conduct User Operational Evaluation System (UOES) Employment.	Articles: - FY 2019 Base Plans:	14.900	16.900	15.039	0.000	15.039

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Complete integration of an AQS-20C and AQS-24B with the MCM USV. Deliver MCM USVs (2) w/AQS-20C and AQS-24B to Fleet to begin evaluation of the system as a Minehunting capability within the MCM MP from LCS. Demonstrate system capability from LCS and/or shore operations through User Evaluated Operational System (UOES) Employment. Prepare and support design changes for initial Navy Developmental Testing (DT). Conduct efforts in preparation for start of MCM USV Full Rate Production (FRP) in FY20. Finalize technical data packages for MCM USV and sonar deploy and retrieve systems. Conduct technical feasibility studies, trade study analysis, tactics development, requirements definition and USV impact studies for Mine Neutralization integration with MCM USV. Construct Architecture Framework products, industry requests for information and develop procurement strategy for Mine Neutralization launcher.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to transition from fabrication of MCM Craft to integration of sonars with the MCM craft.					
Title: MCM USV w/ Payloads Support Articles:					4.288 3.600 4.100 0.000 4.100 - - - - -
FY 2018 Plans: Continue program management, engineering and technical support for efforts. Provide program management, engineering, logistics, and technical support for system level testing and integration. Review UISS logistics documentation and perform gap analysis to identify changes to logistics documents in order to support MCM USV and Payload integration.					
FY 2019 Base Plans: Continue program management, engineering and technical support for efforts. Support testing and assessment of system capabilities to determine Military utility. Support efforts for FRP preparations. Continue to update MCM USV with payloads logistics documentation and implement changes required to support UOES Employment and MCM MP IOT&E. Procure initial spares for test events. Funding increase due to adding Neutralization efforts.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Increase due to additional support for the UOES Employment						
Title: MCM USV w/ Payloads Test and Evaluation	Articles: -	0.000	0.250	4.350	0.000	4.350
FY 2018 Plans: Complete contractor initial integration testing of MCM USV w/AQS-24B and MCM USV w/AQS-20C.						
FY 2019 Base Plans: Conduct a UOES test period (for Q-20C and Q-24B) and a Development Testing and Operational Assessment period for the MCM USV w/ AQS-20C sonar in preparation for future MCM MP IOT&E and production decisions.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 funding for Development Testing and Operational Assessment (DT/OA)in FY19.						
Title: MCM USV w/ Payloads Management	Articles: -	0.000	0.250	0.250	0.000	0.250
FY 2018 Plans: Provide program planning, management and acquisition document updates for the MCM USV w/Payloads program.						
FY 2019 Base Plans: Provide program planning, management and acquisition document updates for the MCM USV w/Payloads program.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No Change						
Accomplishments/Planned Programs Subtotals		42.069	23.594	28.645	0.000	28.645

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)	
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603596N: LCS Mission Modules • OPN/1601: LCS MCM Mission Modules	3.300	3.900	5.000	-	5.000	1.800	0.000	0.000	0.000	0.000	64.129
	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,421.551	2,691.282
Remarks											
0603596N RDT&E Funding shown only reflects funding for required UISS development efforts.											
OPN/1601 - The above funding line accounts for several programs, of which the Unmanned Surface Vehicle programs are only a portion.											
D. Acquisition Strategy											
UISS - Requirements are documented in the Unmanned Influence Sweep System (UISS) Capability Development Document (CDD) and now have been updated, as needed, in the UISS Capability Production Document (CPD). An Engineering and Manufacturing Development (E&MD) contract was awarded in FY14 with a planned option for Low Rate Initial Production (LRIP) in FY 2018.											
E. Performance Metrics											
UISS - Successfully reach Milestone C in FY 2018											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
UISS: Product Development	C/CPIF	Textron Systems, Inc : Hunt Valley, MD	20.538	9.355	Dec 2016	0.700	Jan 2018	1.000	Jan 2019	-		1.000	Continuing	Continuing	Continuing
MHU: Product Development	SS/CPFF	APL JHU : Laurel, MD	12.015	0.200	Jun 2017	0.000		0.000		-		0.000	0.000	12.215	-
MHU: Product Development	C/FPIF	Textron Systems, Inc : Hunt Valley, MD	0.000	7.545	Mar 2017	0.000		0.000		-		0.000	0.000	7.545	-
MHU: Product Development	WR	NSWC PC : Panama City, FL	0.761	0.161	Dec 2016	0.000		0.000		-		0.000	0.000	0.922	-
MHU: Product Development	WR	NUWC N : Newport, RI	0.490	0.250	Dec 2016	0.000		0.000		-		0.000	0.000	0.740	-
MHU: Product Development	WR	NSWC CD : Bethesda, MD	0.205	0.030	Dec 2016	0.000		0.000		-		0.000	0.000	0.235	-
MHU: Product Development	WR	Various : Various	0.570	0.000		0.000		0.000		-		0.000	0.000	0.570	-
MCM USV: Product Development	C/FPIF	Textron Systems, Inc : Hunt Valley, MD	0.000	9.040	Jan 2017	7.900	Jan 2018	3.339	Jan 2019	-		3.339	Continuing	Continuing	Continuing
MCM USV: Product Development1	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.000		3.100	Jan 2019	-		3.100	Continuing	Continuing	Continuing
MCM USV: Product Development	SS/CPFF	Raytheon : Portsmouth, RI	0.000	3.185	Jun 2017	3.500	Feb 2018	1.975	Feb 2019	-		1.975	Continuing	Continuing	Continuing
MCM USV: Product Development	SS/CPFF	APL JHU : Laurel, MD	0.000	0.000		0.000		0.750	Feb 2019	-		0.750	Continuing	Continuing	Continuing
MCM USV: Product Development	WR	NSWC PC : Panama City, FL	0.000	0.925	Jan 2017	3.200	Jan 2018	1.500	Jan 2019	-		1.500	Continuing	Continuing	Continuing
MCM USV: Product Development	WR	NUWC N : Newport, RI	0.000	0.770	Jan 2017	0.800	Jan 2018	0.725	Jan 2019	-		0.725	Continuing	Continuing	Continuing
MCM USV: Product Development	WR	NSWC, CD : Bethesda, MD	0.000	0.980	Jun 2017	1.500	Jan 2018	0.950	Jan 2019	-		0.950	Continuing	Continuing	Continuing
MCM USV: Product Development	C/CPIF	TBD : TBD	0.000	0.000		0.000		2.700	Apr 2019	-		2.700	0.000	2.700	-
MCM USV: Product Development	Various	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal		34.579	32.441			17.600		16.039		-		16.039	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
UISS: Engineering Support	WR	NUWC, N : Newport, RI	0.350	0.250	Dec 2016	0.100	Dec 2017	0.250	Dec 2018	-		0.250	Continuing	Continuing	Continuing
UISS: Engineering Support	WR	NSWC, PC : Panama City, FL	1.689	0.400	Dec 2016	0.100	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
UISS: Engineering Support	WR	NSWC, CD : Bethesda, MD	1.711	0.100	Dec 2016	0.000		0.100	Dec 2018	-		0.100	Continuing	Continuing	Continuing
UISS: Engineering Support	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.670	0.500	Dec 2016	0.100	Jan 2018	0.100	Jan 2019	-		0.100	Continuing	Continuing	Continuing
UISS: Integrated Logistics	WR	NSWC, PC : Panama City, FL	0.290	0.200	Dec 2016	0.050	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
UISS: Integrated Logistics	WR	NSWC, CD : Bethesda, MD	0.611	0.140	Dec 2016	0.050	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
UISS: Integrated Logistics	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.728	0.200	Dec 2016	0.100	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	SSC, PAC : San Diego, CA	0.260	0.050	Dec 2016	0.030	Dec 2017	0.030	Dec 2018	-		0.030	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	NSWC, PC : Panama City, FL	0.360	0.457	Dec 2016	0.120	Feb 2018	0.840	Feb 2019	-		0.840	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	NUWC, N : Newport, RI	0.260	0.477	Dec 2016	0.120	Mar 2018	0.000		-		0.000	0.000	0.857	-
MHU: Engineering Support	WR	NSWC, CD : Bethesda, MD	0.160	0.090	Dec 2016	0.030	Dec 2017	0.030	Dec 2018	-		0.030	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	Various : Various	0.180	0.340	Dec 2016	0.000		0.000		-		0.000	0.000	0.520	-
MCM USV: Engineering Support	WR	NSWC, PC : Panama City, FL	0.000	2.458	Jan 2017	1.400	Jan 2018	1.400	Jan 2019	-		1.400	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM USV: Engineering Support	WR	NUWC, N : Newport, RI	0.000	1.830	Jan 2017	1.200	Jan 2018	0.800	Jan 2019	-		0.800	Continuing	Continuing	Continuing
MCM USV: Engineering Support	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.500	Jan 2018	0.215	Jan 2019	-		0.215	Continuing	Continuing	Continuing
MCM USV: Integrated Logistics	SS/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.400	Jan 2019	-		0.400	Continuing	Continuing	Continuing
MCM USV: Integrated Logistics	SS/CPFF	Northrup Grumman : Annapolis, MD	0.000	0.000		0.000		0.300	Mar 2019	-		0.300	Continuing	Continuing	Continuing
MCM USV: Integrated Logistics	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.500	Jan 2018	0.985	Feb 2019	-		0.985	Continuing	Continuing	Continuing
Subtotal			7.269	7.492		4.400		6.250		-		6.250	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
UISS: Test and Evaluation	WR	NSWC, PC : Panama City, FL	0.430	0.600	Dec 2016	0.200	Dec 2017	1.050	Dec 2018	-		1.050	Continuing	Continuing	Continuing
UISS: Test and Evaluation	WR	NSWC, CD : Bethesda, MD	0.650	0.681	Dec 2016	0.500	Dec 2017	0.400	Dec 2018	-		0.400	Continuing	Continuing	Continuing
UISS: Test and Evaluation	C/CPIF	Textron Systems, Inc : Hunt Valley, MD	1.209	0.500	Dec 2016	0.274	Dec 2017	0.175	Dec 2018	-		0.175	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	WR	NSWC, PC : Panama City, FL	0.000	0.000		0.150	Jun 2018	2.200	Mar 2019	-		2.200	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	WR	NSWC, CD : Bethesda, MD	0.000	0.000		0.100	Jun 2018	0.250	Mar 2019	-		0.250	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	SS/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.400	Mar 2019	-		0.400	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.000		1.500	Mar 2019	-		1.500	0.000	1.500	-
Need Item Text	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)			
Test and Evaluation (\$ in Millions)															
Cost Category Item		Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
		Subtotal	2.289	1.781		1.224		5.975		-	5.975	Continuing	Continuing	N/A	
Management Services (\$ in Millions)															
Cost Category Item		Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
UISS: Travel	WR	NAVSEA : Washington, DC		0.200	0.075	Jun 2017	0.020	Jan 2018	0.020	Jan 2019	-	0.020	Continuing	Continuing	
UISS: Management	C/CPAF	TBD : TBD		1.884	0.280	Dec 2016	0.100	Nov 2017	0.111	Nov 2018	-	0.111	Continuing	Continuing	
MCM USV: Travel	WR	NAVSEA : Washington, DC		0.000	0.000		0.100	Jan 2018	0.100	Jan 2019	-	0.100	Continuing	Continuing	
MCM USV: Management	C/CPAF	TBD : TBD		0.000	0.000		0.150	Nov 2017	0.150	Nov 2018	-	0.150	Continuing	Continuing	
		Subtotal	2.084	0.355		0.370		0.381		-	0.381	Continuing	Continuing	N/A	
		Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract					
		Project Cost Totals	46.221	42.069	23.594	28.645		-	28.645	Continuing	Continuing			N/A	
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

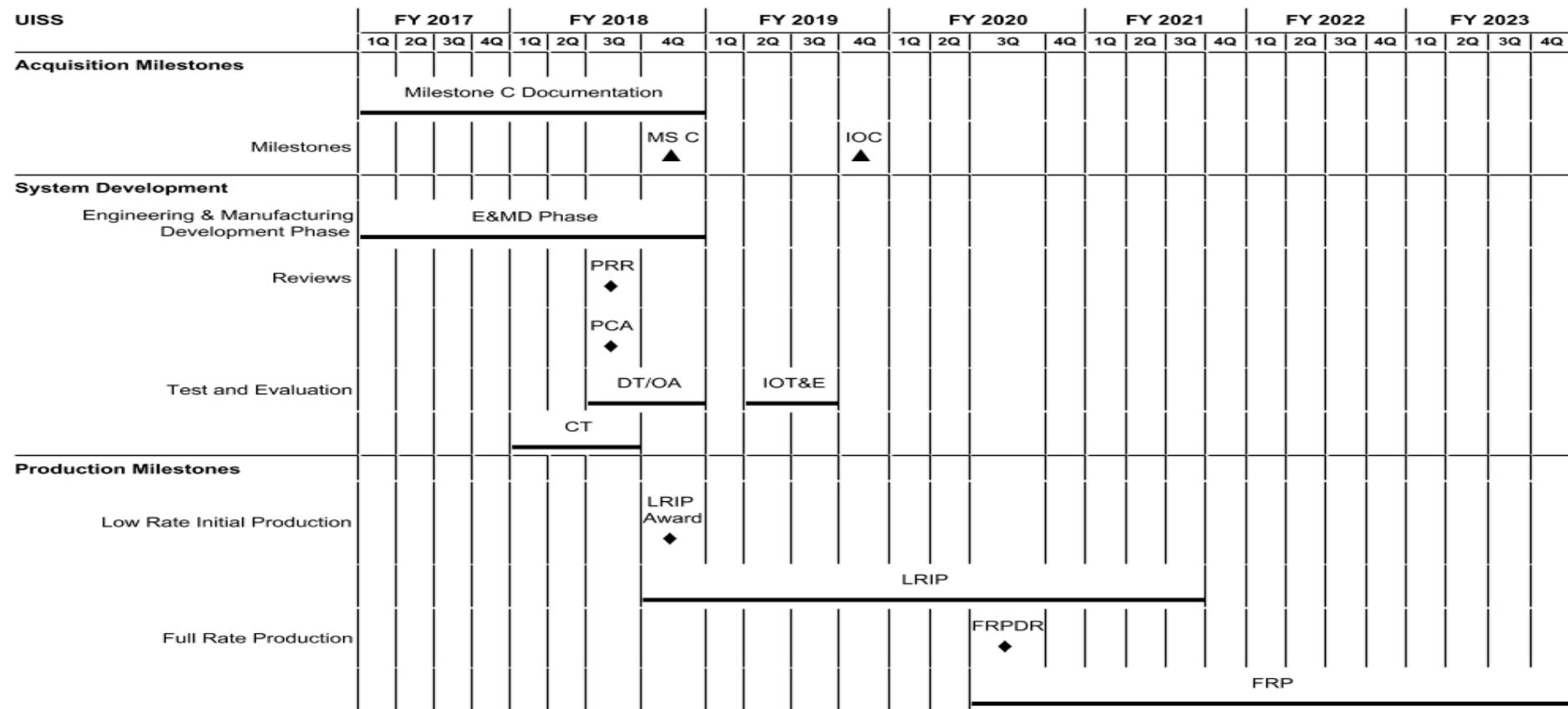
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603502N / *Surface & Shallow Water
MCM*

Project (Number/Name)
1234 / Unmanned Surface Vehicle (USV)



2019PB - 0603502N - 1234

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

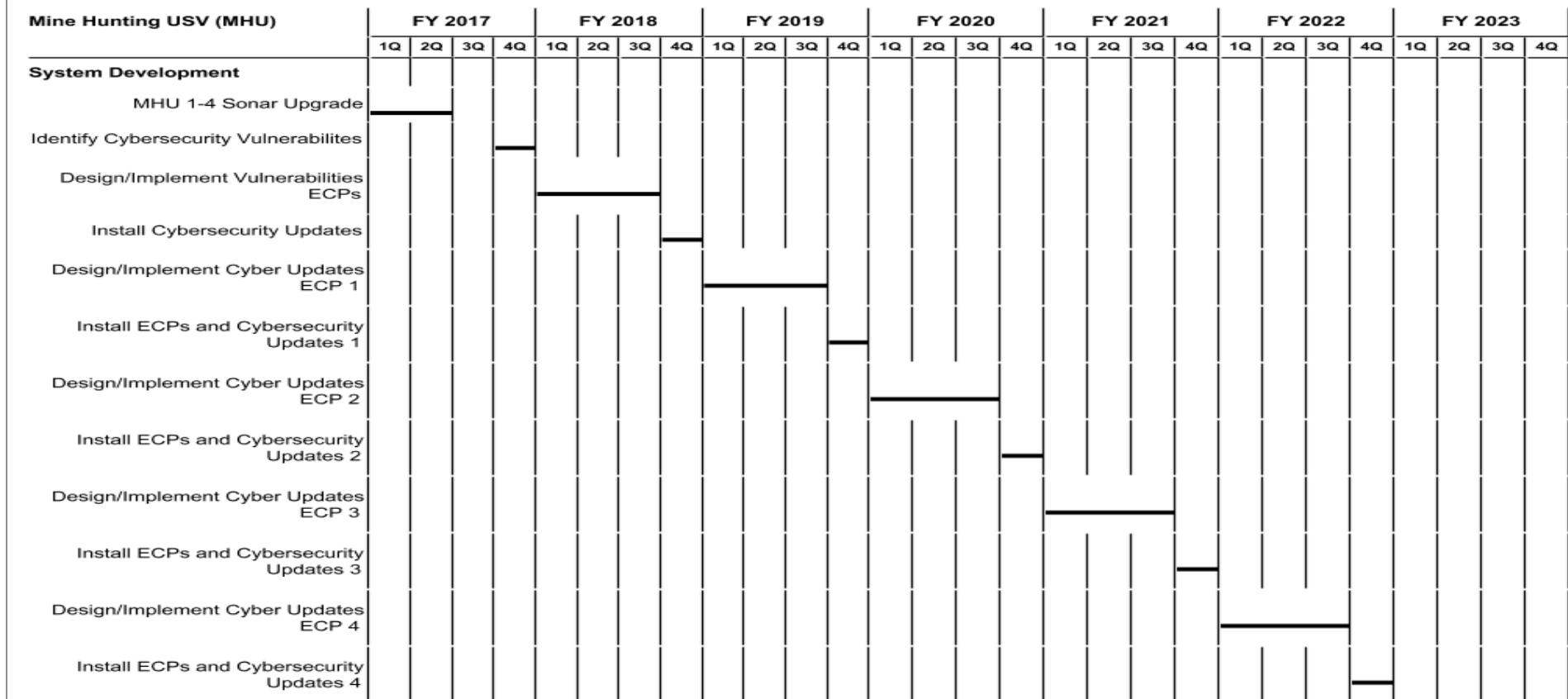
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603502N / *Surface & Shallow Water
MCM*

Project (Number/Name)
1234 / Unmanned Surface Vehicle (USV)



2019PB - 0603502N - 1234

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

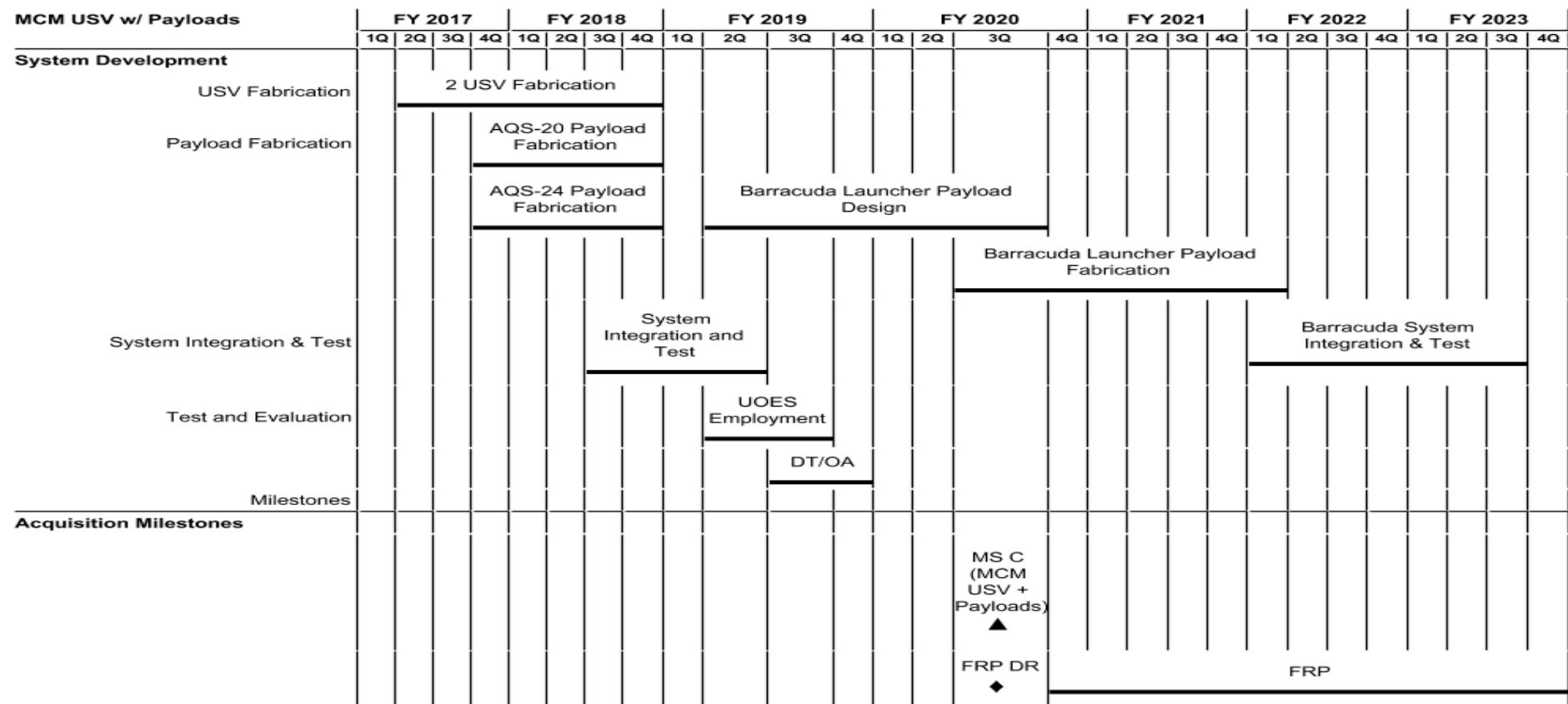
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603502N / Surface & Shallow Water
MCM**Project (Number/Name)**

1234 / Unmanned Surface Vehicle (USV)



2019PB - 0603502N - 1234

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)	Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
UISS				
Acquisition Milestones: Milestone C Documentation	1	2017	4	2018
Acquisition Milestones: Milestones: Milestone C	4	2018	4	2018
Acquisition Milestones: Milestones: Initial Operational Capability	4	2019	4	2019
System Development: Engineering & Manufacturing Development Phase: Engineering & Manufacturing Development Phase	1	2017	4	2018
System Development: Reviews: Production Readiness Review (PRR)	3	2018	3	2018
System Development: Reviews: Physical Configuration Audit (PCA)	3	2018	3	2018
System Development: Test and Evaluation: DT Testing	3	2018	4	2018
System Development: Test and Evaluation: Initial Operational Test & Evaluation	2	2019	3	2019
System Development: Test and Evaluation: Contractor Testing	1	2018	3	2018
Production Milestones: Low Rate Initial Production: LRIP Contract Award	4	2018	4	2018
Production Milestones: Low Rate Initial Production: LRIP phase	4	2018	3	2021
Production Milestones: Full Rate Production: Full Rate Production Decision Review	3	2020	3	2020
Production Milestones: Full Rate Production: Full Rate Production	3	2020	4	2023
Mine Hunting USV (MHU)				
System Development: MHU 1-4 Sonar Upgrade:	1	2017	2	2017
System Development: Identify Cybersecurity Vulnerabilities:	4	2017	4	2017
System Development: Design/Implement Vulnerabilities ECPs:	1	2018	3	2018
System Development: Install Cybersecurity Updates:	4	2018	4	2018
System Development: Design/Implement Cyber Updates ECP 1:	1	2019	3	2019
System Development: Install ECPs and Cybersecurity Updates 1:	4	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)			
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
System Development: Design/Implement Cyber Updates ECP 2:		1	2020	3	2020
System Development: Install ECPs and Cybersecurity Updates 2:		4	2020	4	2020
System Development: Design/Implement Cyber Updates ECP 3:		1	2021	3	2021
System Development: Install ECPs and Cybersecurity Updates 3:		4	2021	4	2021
System Development: Design/Implement Cyber Updates ECP 4:		1	2022	3	2022
System Development: Install ECPs and Cybersecurity Updates 4:		4	2022	4	2022
MCM USV w/ Payloads					
System Development: USV Fabrication: 2 USV Fabrication		2	2017	4	2018
System Development: Payload Fabrication: AQS-20 Payload Fabrication		4	2017	4	2018
System Development: Payload Fabrication: AQS-24 Payload Fabrication		4	2017	4	2018
System Development: Payload Fabrication: Barracuda Launcher Payload Design		2	2019	3	2020
System Development: Payload Fabrication: Barracuda Launcher Payload Fabrication		3	2020	1	2022
System Development: System Integration & Test: System Integration and Test		3	2018	2	2019
System Development: System Integration & Test: Barracuda System Integration & Test		1	2022	3	2023
System Development: Test and Evaluation: UOES Employment		2	2019	3	2019
System Development: Test and Evaluation: Development Test/Operational Assessment		3	2019	4	2019
Acquisition Milestones: Milestone C (MCM USV + Payloads)		3	2020	3	2020
Acquisition Milestones: Full Rate Production Decision Review		3	2020	3	2020
Acquisition Milestones: Full Rate Production		4	2020	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM					Project (Number/Name) 1235 / Mine Warfare Planning and Analysis			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1235: Mine Warfare Planning and Analysis	7.520	8.664	3.139	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.323
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Note FY 2019 and future funding for Project 1235 is in Program Element (PE) 0604127N. Project realigned from PE 0603502N starting in FY 2019.												
A. Mission Description and Budget Item Justification Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
Title: MEDAL Product Development Articles:						4.114	1.433	0.000	0.000	0.000		
FY 2018 Plans: MINEnet Tactical v1.3 development to include Minefield Planning and JABS initial capabilities and COBRA updates. Update MEDAL EA course curriculum for MINEnet Tactical 1.3.						-	-	-	-	-		
FY 2019 Base Plans: Funding has been realigned to PE 0604127N.												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.												
Title: MEDAL Support Articles:						2.945	0.423	0.000	0.000	0.000		
FY 2018 Plans: Initiate the development of MEDAL EA MINEnet Tactical v1.3 with reduced set of capability upgrades. Provide technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Support efforts to include communication with activities such as applied labs,						-	-	-	-	-		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1235 / Mine Warfare Planning and Analysis				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Begin fielding MINEnet Tactical v1.2.2						
FY 2019 Base Plans: Funding has been realigned to PE 0604127N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.						
Title: MEDAL Test and Evaluation FY 2018 Plans: MEDAL EA v1.2.2 - Conduct series of Development Tests (DTs) and a series of regression tests. Continue System Development testing activities with multiple platforms including LCS MCM MPAS, ISNS, CANES and ONENET integration tests. Continue Cybersecurity patching and assessments. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan.		Articles: 0.897 -	0.675 -	0.000 -	0.000 -	0.000 -
FY 2019 Base Plans: Funding has been realigned to PE 0604127N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.						
Title: MEDAL Management FY 2018 Plans: Continue to provide program management support and travel for MEDAL program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. As part of the systems engineering element of PM, communicate and coordinate with MIW C4ISR, ICWS, Organic MCM, Mainstreaming MIEW, Expeditionary Warfare C4ISR, tactics development,		Articles: 0.708 -	0.608 -	0.000 -	0.000 -	0.000 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1235 / Mine Warfare Planning and Analysis				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching System (ABS), LCS, and other programs as they relate to MEDAL and MIW Mission Planning, Evaluation, and C4ISR. Other PM tasking to include briefings, demonstrations, and project planning as required.												
FY 2019 Base Plans: Funding has been realigned to PE 0604127N.												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.												
Accomplishments/Planned Programs Subtotals						8.664	3.139	0.000	0.000	0.000		
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2019						Cost To
• 2622/LV075: Mine Sweeping Replacement (MEDAL).	2.358	3.585	1.111	Base	OCO	Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost
				-		1.111	0.799	0.889	0.891	0.900	0.000	16.356
Remarks												
D. Acquisition Strategy Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Surface and Mine War-fighting Development Center (SMWDC). The fleet inputs are then consolidated by COMINEWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software.												
E. Performance Metrics Mine Warfare and Environmental Decision Aids Library (MEDAL) development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCEnet requirements.												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018		
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 1235 / Mine Warfare Planning and Analysis		
Product Development (\$ in Millions)														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	C/CPAF	SAIC : McLean, VA	4.464	4.114	Oct 2016	1.433	Oct 2017	0.000	-	0.000	0.000	0.000	10.011	-
Subtotal				4.464	4.114	1.433		0.000	-	0.000	0.000	0.000	10.011	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.														
Support (\$ in Millions)														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	WR	NSWC PC : Panama City FL	0.247	2.945	Nov 2016	0.423	Nov 2017	0.000	-	0.000	0.000	0.000	3.615	-
Subtotal				0.247	2.945	0.423		0.000	-	0.000	0.000	0.000	3.615	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.														
Test and Evaluation (\$ in Millions)														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	C/CPAF	SAIC : McLean, VA	2.398	0.897	Oct 2016	0.675	Oct 2017	0.000	-	0.000	0.000	0.000	3.970	-
Subtotal				2.398	0.897	0.675		0.000	-	0.000	0.000	0.000	3.970	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.														

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1235 / Mine Warfare Planning and Analysis							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	WR	NSWC PC : Panama City FI	0.411	0.708	Nov 2016	0.608	Dec 2017	0.000		-		0.000	0.000	1.727	-
Subtotal		0.411	0.708		0.608		0.000		-			0.000	0.000	1.727	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			7.520	8.664		3.139		0.000		-		0.000	0.000	19.323	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603502N / Surface & Shallow Water MCM

Project (Number/Name)

1235 | Mine Warfare Planning and Analysis

2019PB - 0603502N - 1235

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Date: February 2018 Project (Number/Name) 1235 / Mine Warfare Planning and Analysis
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
MEDAL				
Schedule Detail	1	2019	1	2019
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.2 Development	1	2017	4	2017
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.3X Development	1	2018	4	2018
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.2X Test & Evaluation	1	2018	1	2018
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.2 Fielding	2	2018	4	2018

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Note

FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N. Project realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

In order to accelerate future capability and support steady growth of the fleet's UUV Family of Systems (FoS) the Snakehead Large Displacement Unmanned Undersea Vehicle (LDUUV) program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability.

The Snakehead LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. The Snakehead LDUUV is a CNO/ASN(RDA) approved Accelerated Acquisition phased approach to build capabilities at a manageable level of risk in the Navy's class of Large Displacement Unmanned Undersea Vehicles. It consists of two phases of government-led development with significant industry involvement transitioning to industry production of the full vehicles.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	17.440	51.838	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2094 / Unmanned Underwater Vehicle				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
reduce risk with submarine and surface ship integration.						
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604031N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604031N from PE 0603502N starting in FY 2019.						
Title: LDUUV Support FY 2018 Plans: Complete initial development of documentation and drawings, Submarine Interface Control documents, System Hazard Analysis, Master System Test and Evaluation Plan (MSTEP); work on required documentation for detailed design and critical design review. Continue supportability analysis. Support demonstration exercises. Ramp up due to larger efforts as part of detailed design.		Articles: 2.832 -	6.662 -	0.000 -	0.000 -	0.000 -
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604031N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604031N from PE 0603502N starting in FY 2019.						
Title: LDUUV Management FY 2018 Plans: Provide program management support and travel for the LDUUV program. Program management plans include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and		Articles: 1.673 -	1.687 -	0.000 -	0.000 -	0.000 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018							
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle							
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018				
coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program.										FY 2019 Base	FY 2019 OCO				
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604031N. FY 2019 OCO Plans: N/A										FY 2019 Total					
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604031N from PE 0603502N starting in FY 2019.															
Accomplishments/Planned Programs Subtotals										21.945	60.187				
0.000										0.000	0.000				
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• 0604031N/2094: <i>Unmanned Undersea Vehicles</i>	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing				
Remarks															
Funding moved to new Program Element in FY2019															
D. Acquisition Strategy															
Utilizing Navy requirements to insert incremental capability, the LDUUV program will design, build, and test risk-reducing UUVs in two phases followed by competitive award of a production contract.															
E. Performance Metrics															
LDUUV - Completed Preliminary Design Review (PDR) 4Q FY17															
LDUUV - Complete Critical Design Review (CDR) 1Q FY19															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Vehicles, Hardware, & Design	WR	NUWC Newport : Newport, RI	6.604	6.070	Dec 2016	9.127	Dec 2017	0.000		-		0.000	0.000	21.801	-
LDUUV Vehicles, Hardware, & Design	C/CPFF	Various : Various	13.299	2.100	Feb 2017	27.871	Feb 2018	0.000		-		0.000	0.000	43.270	-
LDUUV Vehicles, Hardware, & Design	WR	NSWC Carderock : Carderock, MD	1.705	2.805	Dec 2016	2.920	Dec 2017	0.000		-		0.000	0.000	7.430	-
LDUUV Vehicles, Hardware, & Design	WR	NSWC PCD : Panama City, FL	0.400	0.120	Dec 2016	0.166	Dec 2017	0.000		-		0.000	0.000	0.686	-
LDUUV Vehicles, Hardware, & Design	SS/CPFF	ARL PSU : State College, PA	0.907	4.170	Jan 2017	6.176	Jan 2018	0.000		-		0.000	0.000	11.253	-
LDUUV Vehicles, Hardware, & Design	SS/CPFF	APL/JHU : Laurel, MD	0.988	0.000		0.000		0.000		-		0.000	0.000	0.988	-
LDUUV Vehicles, Hardware, & Design	WR	SSC Pacific : San Diego, CA	0.455	0.215	Jan 2017	0.423	Feb 2018	0.000		-		0.000	0.000	1.093	-
LDUUV Vehicles, Hardware, & Design	WR	NUWC KPT : Keyport, WA	0.075	1.750	Jan 2017	4.391	Feb 2018	0.000		-		0.000	0.000	6.216	-
LDUUV Risk Reduction Sonar	C/CPFF	ARL UT : Austin, TX	0.228	0.000	Jan 2017	0.551	Feb 2018	0.000		-		0.000	0.000	0.779	-
LDUUV Experimentation and Risk Reduction - Battery Certification	WR	NSWC Crane : Crane IN	0.925	0.210	Dec 2016	0.213	Dec 2017	0.000		-		0.000	0.000	1.348	-
LDUUV Platform Integration	Various	VAR : VAR	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			25.586	17.440		51.838		0.000		-		0.000	0.000	94.864	N/A

Remarks

FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV ILS & Engineering Support	Various	VAR : VAR	17.768	0.250	Dec 2016	0.000		0.000		-		0.000	0.000	18.018	-
PLUS ILS & Engineering Support	Various	VAR : VAR	8.321	0.000		0.000		0.000		-		0.000	0.000	8.321	-
LDUUV Engineering Support	WR	NUWC Newport : Newport, RI	1.079	0.723	Dec 2016	4.452	Dec 2017	0.000		-		0.000	0.000	6.254	-
LDUUV Launch and Recovery Engineering Support	WR	NSWC PCD : Panama City, FL	0.000	0.260	Dec 2016	0.306	Dec 2017	0.000		-		0.000	0.000	0.566	-
LDUUV Hydrodynamics and Propulsion Engineering Support	C/CPFF	VAR : VAR	0.295	0.701	Feb 2017	0.450	Feb 2018	0.000		-		0.000	0.000	1.446	-
LDUUV Hull and Propulsion Engineering Support	WR	NSWC Carderock : Carderock, MD	0.288	0.468	Dec 2016	0.286	Dec 2017	0.000		-		0.000	0.000	1.042	-
LDUUV Command and Control Engineering Support	WR	SSC Pacific : San Diego, CA	0.122	0.120	Dec 2016	0.000		0.000		-		0.000	0.000	0.242	-
LDUUV Acoustic Engineering Support	SS/CPFF	ARL UW : Seattle, WA	0.200	0.000	Jan 2017	0.208	Jan 2018	0.000		-		0.000	0.000	0.408	-
LDUUV Engineering Support	SS/CPFF	APL/JHU : Laurel, MD	0.275	0.116	Jan 2017	0.335	Jan 2018	0.000		-		0.000	0.000	0.726	-
LDUUV ILS & Engineering Support	WR	NUWC Keyport : Keyport, WA	0.325	0.131	Dec 2016	0.125	Dec 2017	0.000		-		0.000	0.000	0.581	-
LDUUV ILS & Engineering Support2	SS/CPFF	VAR : VAR	0.110	0.063	Feb 2017	0.500	Feb 2018	0.000		-		0.000	0.000	0.673	-
Subtotal		28.783	2.832		6.662		0.000		-		0.000	0.000	38.277	N/A	

Remarks

FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
PLUS Fleet Experimentation	Various	Various : Various	5.077	0.000		0.000		0.000		-		0.000	0.000	5.077	-	
		Subtotal	5.077	0.000		0.000		0.000		-		0.000	0.000	5.077	N/A	
Remarks																
FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.																
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
LDUUV Program Management	WR	NUWC Newport : Newport, RI	1.715	0.380	Dec 2016	0.536	Dec 2017	0.000		-		0.000	0.000	2.631	-	
LDUUV Program Management	Various	Various : Various	1.899	1.130	Dec 2016	0.989	Dec 2017	0.000		-		0.000	0.000	4.018	-	
LDUUV Travel	Various	NAVSEA : Washington, DC	0.400	0.163	Dec 2016	0.162	Dec 2017	0.000		-		0.000	0.000	0.725	-	
PLUS Program Management	Various	VAR : VAR	1.239	0.000		0.000		0.000		-		0.000	0.000	1.239	-	
PLUS Travel	Various	NAVSEA : Washington, DC	0.161	0.000		0.000		0.000		-		0.000	0.000	0.161	-	
		Subtotal	5.414	1.673		1.687		0.000		-		0.000	0.000	8.774	N/A	
Remarks																
FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.																
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				64.860	21.945		60.187		0.000		-		0.000	0.000	146.992	N/A
Remarks																
FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

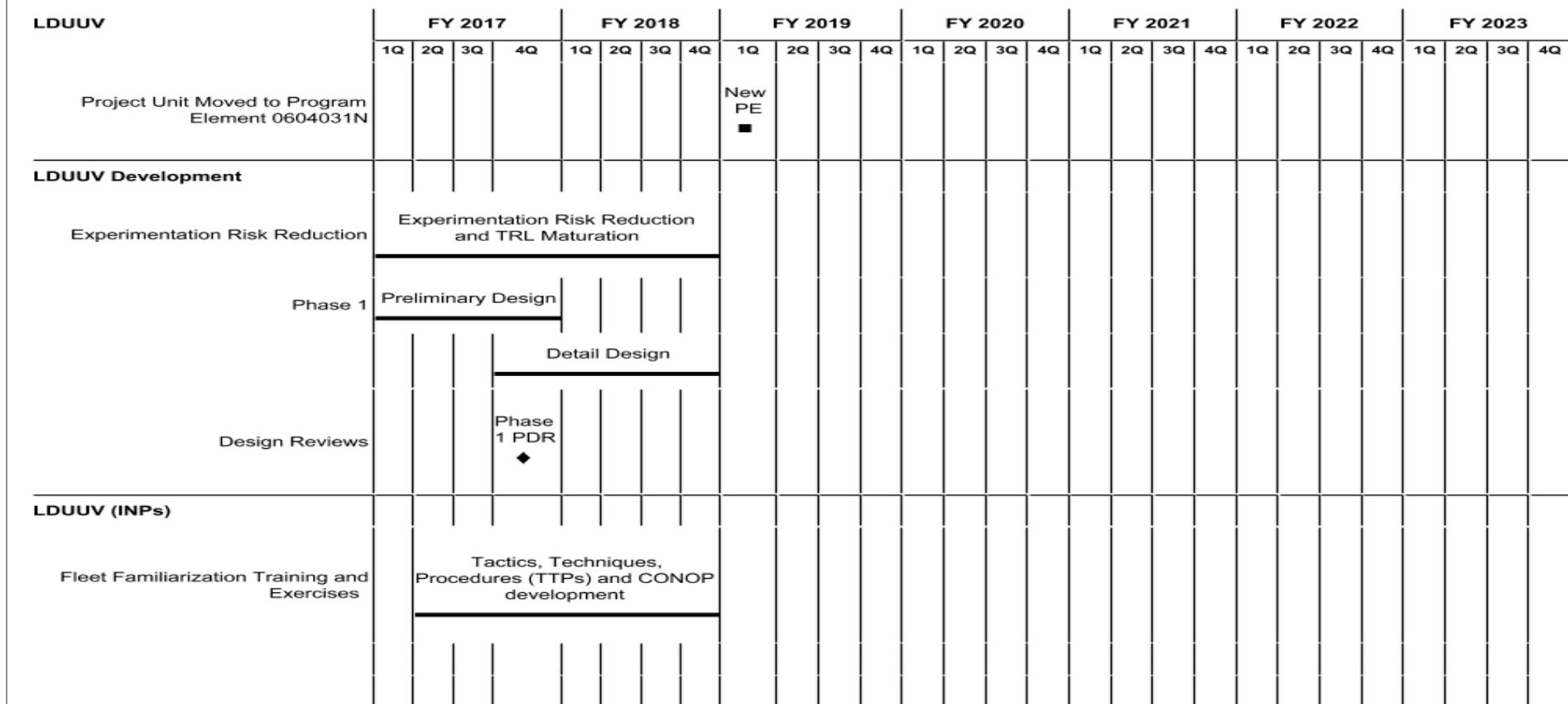
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603502N / Surface & Shallow Water
MCM**Project (Number/Name)**

2094 / Unmanned Underwater Vehicle



2019PB - 0603502N - 2094.L24

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2094 / Unmanned Underwater Vehicle

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LDUUV				
Project Unit Moved to Program Element 0604031N:	1	2019	1	2019
LDUUV Development: Experimentation Risk Reduction: Technology Risk Reduction	1	2017	4	2018
LDUUV Development: Phase 1: Preliminary Design	1	2017	4	2017
LDUUV Development: Phase 1: Detail Design	4	2017	4	2018
LDUUV Development: Design Reviews: Phase 1 PDR	4	2017	4	2017
LDUUV (INPs): Fleet Familiarization Training and Exercises: Schedule Detail	2	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603502N / Surface & Shallow Water MCM				2131 / Assault Breaching System			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2131: Assault Breaching System	610.235	19.651	11.623	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	641.509
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for Project 2131 is in Program Element (PE) 0604126N. Project realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

This program provides a combination of U.S. Navy systems to counter the threat to amphibious forces from obstacles and anti-landing/sea mines in the Beach Zone and Surf Zone (0-10 ft water). The Assault Breaching Systems (ABS) consist of a system of systems approach that includes the following programs: JABS - Joint Direct Attack Munition (JDAM) Assault Breaching System; CMS - Countermeine System; COBRA - Coastal Battlefield Reconnaissance and Analysis; PNMS - Precision Navigation and Marking System; and C4I - Command, Control, Computers, Communications, and Intelligence. The Assault Breaching Systems enable the Navy-Marine Corps team to conduct Joint Forcible Entry Operations (JFEO), Ship-To-Objective Maneuver (STOM), and other combat operations to project power ashore.

The JDAM Assault Breaching System (JABS) is a currently fielded system that neutralizes surface mines and obstacles in the Beach Zone and Surf Zone. The ABS Tactical Decision Aid optimizes the Desired Points of Impact (DPI) for JDAM munitions to effectively neutralize mines and obstacles while minimizing the required number of munitions and friendly aircraft sorties. Continued testing is required to optimize the ABS Tactical Decision Aid database for the most common enemy mines and obstacles.

Coastal Battlefield Reconnaissance and Analysis (COBRA) is the ABS program to conduct ISR/T. This system provides Airborne Mine Countermeasures (AMCM) capability, and one system consists of two Airborne Payloads and one Post Mission Analysis Station. Block I is a multispectral sensor capable of daytime detection of surface-laid minefields and obstacles in the Beach Zone and adds on-board near real-time processing. Block II capability adds a 3D LIDAR (Light Detection and Ranging) sensor that enables nighttime detection of mines and obstacles in the Beach Zone and the Surf Zone (0-10 ft of water). Block II also adds on-board real-time processing of multispectral imagery data. COBRA consists of a modular payload architecture that can be integrated onto the MQ-8B Fire Scout or USN manned helicopters like the MH-60. COBRA will serve as the "detect" mission module in the Surf Zone and Beach Zone for the Littoral Combat Ship (LCS) Mine Warfare mission package.

Precision Navigation & Marking System (PNMS) provides navigational upgrades for the Landing Craft, Air Cushion (LCAC); Landing Craft, Utility (LCU); and Amphibious Assault Vehicle (AAV). A system of virtual lane marking improves the navigation ability of these three assault craft which enables them to navigate safely through the neutralized assault lanes provided by JABS and CMS. OPN funds the CRAFTALTS to upgrade the navigation systems. LCU Navigation Upgrade: Modernized the navigation system to enable safe transit through the breached lane. LCAC Autopilot Upgrade: An integrated improvement to the LCAC Service Life Extension Program (SLEP) navigation system for craft control that allows precise navigation and hovering within the breached lane. These software upgrades and backfits occur during scheduled LCAC SLEPs. AAV Navigation Upgrade : Modernize the navigation system to enable precise transit through the breached lane.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2131 / Assault Breaching System				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Funding has been realigned to PE 0604126N.						
Title: Test and Evaluation: FY 2018 Plans: COBRA - Continue advance surf zone component/capability design and test. FY 2019 Base Plans: Funding has been realigned to PE 0604126N. FY 2019 OCO Plans: N/A	Articles: - FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604126N.	5.580	2.209	0.000	0.000	0.000
Title: Management: FY 2018 Plans: Continue to manage Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion. FY 2019 Base Plans: Funding has been realigned to PE 0604126N. FY 2019 OCO Plans: N/A	Articles: - FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604126N.	0.935	0.804	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals		19.651	11.623	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System			
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/2624: SHALLOW WATER Mine CM SHIP	8.875	8.796	8.616	-	8.616	8.730	5.595	5.703	5.811	0.000	100.599
Remarks											
D. Acquisition Strategy Countermine/Counter Obstacle (CM/CO)is JDAM Assault Breaching System (JABS) and ABS Tactical Decision Aid testing is ongoing. Intelligence/Surveillance/Reconnaissance/Targeting (ISR/T) - COBRA Block I achieved MS C in 3rd QTR FY 2009. Precision Navigation & Marking System (PNMS) - The navigation upgrades for the Landing Craft, Air Cushion (LCAC) and Landing Craft, Utility (LCU) are complete. AAV enhancements will be achieved through an ECP (PMA AAV (Marine Corps)) in 1st QTR FY 2019.											
E. Performance Metrics Successful COBRA integration, flight tests: Operational Assessment (OA) and Development Testing (DT) into the MQ-8B FIRESCOUT. COBRA achieved IOC in FY 2017. The above systems continue to meet or exceed their Key Performance Parameters.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Dev, COBRA	C/CPAF	Arete : Tucson, AZ	172.558	9.049	Jan 2017	5.347	Dec 2017	0.000		-		0.000	0.000	186.954	-
Primary Hardware Dev, CMS	C/CPAF	Boeing : St. Louis, MO	99.974	0.000		0.000		0.000		-		0.000	0.000	99.974	-
Ancillary Hardware Dev, JABS	C/CPAF	Various : Various	22.078	0.000		0.000		0.000		-		0.000	0.000	22.078	-
Systems Engineering, COBRA	WR	NSWC, PC : PANAMA CITY, FL	20.860	0.000		0.781	Oct 2017	0.000		-		0.000	0.000	21.641	-
Software Dev, COBRA	WR	NAVAIR : Patuxent River, MD	12.958	0.000		0.000		0.000		-		0.000	0.000	12.958	-
Systems Engineering, CMS	WR	NSWC, PC : PANAMA CITY, FL	31.505	0.000		0.000		0.000		-		0.000	0.000	31.505	-
JABS	WR	NSWC PC : NSWC IH	8.463	1.555	May 2017	0.799	Nov 2017	0.000		-		0.000	0.000	10.817	-
Training Dev, COBRA	WR	NSWC, PC : PANAMA CITY, FL	10.586	0.775	Oct 2016	0.559	Nov 2017	0.000		-		0.000	0.000	11.920	-
Tooling	WR	NSWC, PC : PANAMA CITY, FL	0.860	0.000		0.000		0.000		-		0.000	0.000	0.860	-
ABS IPT/Test Assets/Proj Eng	WR	NSWC, PC : PANAMA CITY, FL	9.065	0.251	May 2017	0.182	Nov 2017	0.000		-		0.000	0.000	9.498	-
Precision Navigation & Marking	WR	NSWC, PC : PANAMA CITY, FL	16.526	0.000		0.000		0.000		-		0.000	0.000	16.526	-
Subtotal			405.433	11.630		7.668		0.000		-		0.000	0.000	424.731	N/A

Remarks

FY 2019 and future funding has been realigned to PE 0604126N.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	20.731	0.849	Oct 2016	0.613	Nov 2017	0.000		-		0.000	0.000	22.193	-
Software Development	WR	NSWC, PC : PANAMA CITY, FL	8.037	0.202	Nov 2016	0.000		0.000		-		0.000	0.000	8.239	-
Integrated Logistics Support	WR	NSWC PC : PANAMA CITY, FL	2.712	0.099	Oct 2016	0.072	Nov 2017	0.000		-		0.000	0.000	2.883	-
Configuration Management	WR	NSWC, PC : PANAMA CITY, FL	3.744	0.100	Nov 2016	0.072	Oct 2017	0.000		-		0.000	0.000	3.916	-
Technical Data	WR	NSWC, PC : PANAMA CITY, FL	2.588	0.000		0.000		0.000		-		0.000	0.000	2.588	-
Studies & Analysis	WR	NSWC IH : INDIAN HEAD, MD	6.276	0.256	Nov 2016	0.185	Oct 2017	0.000		-		0.000	0.000	6.717	-
GFE	WR	NSWC, PC : PANAMA CITY, FL	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Subtotal			44.488	1.506		0.942		0.000		-		0.000	0.000	46.936	N/A
Remarks															
FY 2019 and future funding has been realigned to PE 0604126N.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	WR	NSWC, IH : INDIAN HEAD, MD	60.898	2.484	May 2017	1.126	Oct 2017	0.000		-		0.000	0.000	64.508	-
Operational Test & Evaluation	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	8.655	1.074	Nov 2016	0.361	Nov 2017	0.000		-		0.000	0.000	10.090	-
Tooling	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	0.700	0.000		0.000		0.000		-		0.000	0.000	0.700	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018		
Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM		
Test and Evaluation (\$ in Millions)												Project (Number/Name) 2131 / Assault Breaching System		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GFE	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	0.400	0.000		0.000		0.000		-	0.000	0.000	0.400	-
Development Test	WR	NSWC PC : Panama City, FL	13.634	2.022	May 2017	0.722	Nov 2017	0.000		-	0.000	0.000	16.378	-
Subtotal		84.287	5.580		2.209		0.000		-	0.000	0.000	92.076	N/A	
Remarks FY 2019 and future funding has been realigned to PE 0604126N.														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	C/CPFF	BAH, Northrop Grumman : DC, FL	10.935	0.125	Dec 2016	0.090	Dec 2017	0.000		-	0.000	0.000	11.150	-
Government Engineering Support	WR	NSWC, IH : INDIAN HEAD, MD	36.077	0.409	May 2017	0.359	Nov 2017	0.000		-	0.000	0.000	36.845	-
Program Management Support	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	25.657	0.351	Apr 2017	0.318	Nov 2017	0.000		-	0.000	0.000	26.326	-
Travel	WR	NAVSEA : WNY, DC	1.713	0.050	Oct 2016	0.037	Oct 2017	0.000		-	0.000	0.000	1.800	-
Assessment/BTR	C/CPAF	VARIOUS : VARIOUS	1.434	0.000		0.000		0.000		-	0.000	0.000	1.434	-
Acquisition Workforce	Various	VARIOUS : VARIOUS	0.211	0.000		0.000		0.000		-	0.000	0.000	0.211	-
Subtotal		76.027	0.935		0.804		0.000		-	0.000	0.000	77.766	N/A	
Remarks FY 2019 and future funding has been realigned to PE 0604126N.														

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018
Appropriation/Budget Activity			R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4			PE 0603502N / Surface & Shallow Water MCM				2131 / Assault Breaching System			
	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	610.235	19.651	11.623	0.000	-	0.000	0.000	641.509	N/A	
<u>Remarks</u>										

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

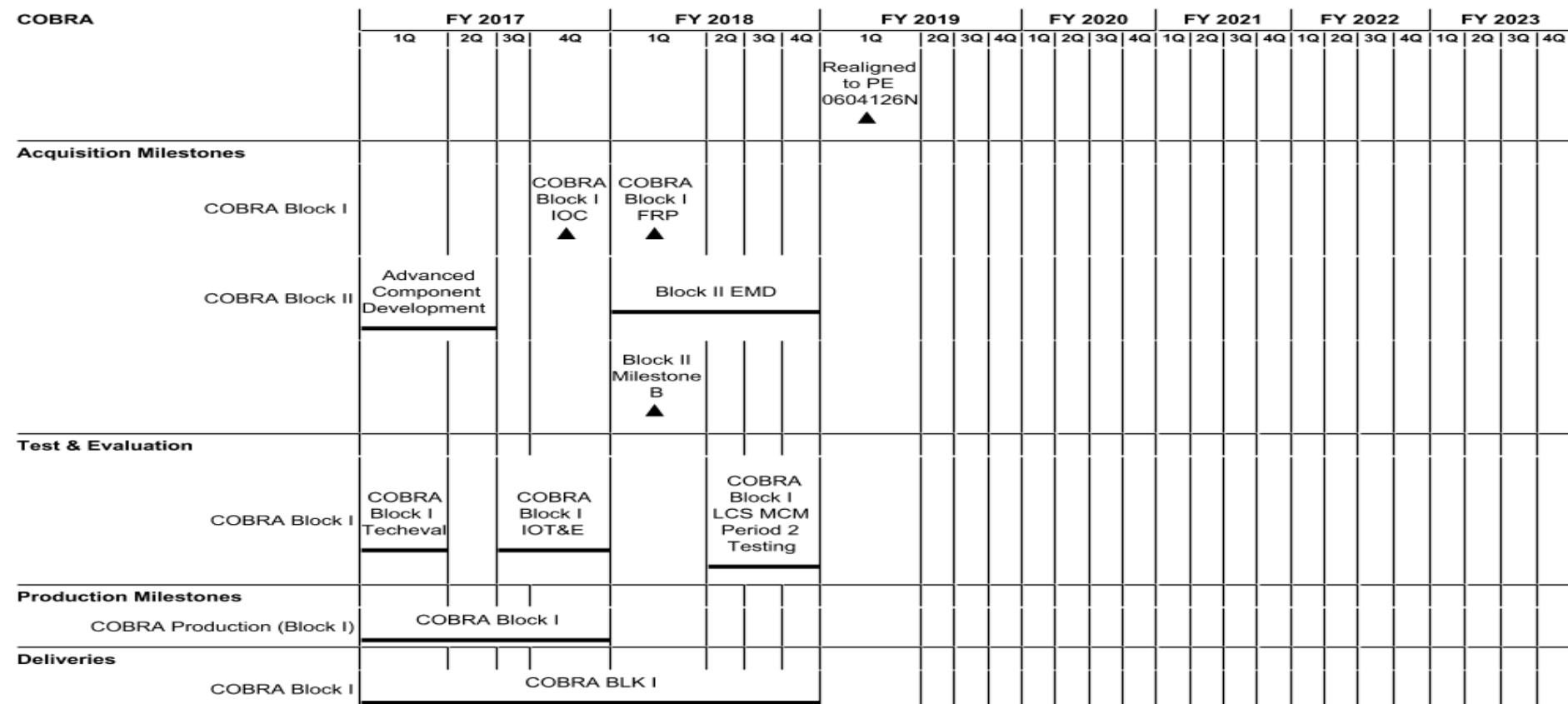
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603502N / Surface & Shallow Water
MCM**Project (Number/Name)**

2131 / Assault Breaching System



2019PB - 0603502N - 2131

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2131 / Assault Breaching System

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
COBRA				
Schedule Detail	1	2019	1	2019
Acquisition Milestones: COBRA Block I: COBRA Block I IOC	4	2017	4	2017
Acquisition Milestones: COBRA Block I: COBRA Block I FRP	1	2018	1	2018
Acquisition Milestones: COBRA Block II: Advanced Component Development	1	2017	2	2017
Acquisition Milestones: COBRA Block II: COBRA Block II EMD	1	2018	4	2018
Acquisition Milestones: COBRA Block II: COBRA Block II Milestone B	1	2018	1	2018
Test & Evaluation: COBRA Block I: COBRA Block I Techeval (DT Phase 2)	1	2017	1	2017
Test & Evaluation: COBRA Block I: COBRA Block I IOT&E	3	2017	4	2017
Test & Evaluation: COBRA Block I: COBRA Block I LCS MCM Period 2 Testing	2	2018	4	2018
Production Milestones: COBRA Production (Block I): COBRA Block I	1	2017	4	2017
Deliveries: COBRA Block I: Block I	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2989 / Barracuda			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2989: Barracuda	0.000	0.000	20.761	31.282	-	31.282	32.237	31.625	37.415	38.227	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Barracuda program provides an expendable, low cost, and unmanned mine neutralization capability against previously located near-surface mines with the potential to address other targets. Barracuda is a mine neutralization system with the form factor of an A-size sonobuoy. It is a modular weapon that will be stored and assembled on LCS, will be deployed from the Mine Countermeasures Unmanned Surface Vehicle (MCM USV), and will maintain communications with the operator on LCS while autonomously re-acquiring mines in the near surface and await a fire command from the operator on board LCS.

An Analysis of Alternatives (AoA) was conducted in June 2015 to address the unmet near surface requirements resulting from cancelation of the RAMICS program in FY13. Several systems were considered and Barracuda was selected. The Naval Capabilities Board (NCB) approved the AoA results for the Gate 2 decision in July 2015. The NCB endorsed the Barracuda Capabilities Development Document (CDD) for the Gate 3 decision in April 2016; CDD was approved in September 2016.

The Barracuda baseline capability is transitioned from the Office of Naval Research (ONR) Single Sortie Detect-To-Engage (SS DTE) Future Naval Capability (FNC). Barracuda provides the only near surface mine neutralization system that will allow the Littoral Combat Ship (LCS) Mine Countermeasure (MCM) Mission Package (MP) to fully meet its two minehunting performance requirements. Initial Barracuda deployment will be on the MCM USV as part of the LCS MCM MP. Subsequent plans are to expand potential means of providing in-stride MCM capabilities and transitioning follow-on FNCs from ONR. Barracuda may be hosted by an LCS, Expeditionary Sea Base (ESB), or shore facility.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Barracuda: Product Development	0.000	16.118	25.879	0.000	25.879
Articles:	-	-	-	-	-

FY 2018 Plans:

Conduct Barracuda Integrated Baseline Review (IBR) to confirm sufficient resource loading and establish a baseline to track earned value. Initiate detailed design of the system starting with conducting a System Requirements Review (SRR) to verify requirements traceability, conduct a System Functional Review (SFR), and prepare for Milestone B and contract award.

FY 2019 Base Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2989 / Barracuda	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Begin component modeling, simulation, fabrication and testing to verify design in preparation for Preliminary Design Review (PDR). Conduct and manage safety reviews as development efforts proceed.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: FY2019 funding increase supports modeling and simulation efforts following Milestone B and EM&D.				
Title: Barracuda: Engineering Support	Articles:	0.000	4.357	5.167
FY 2018 Plans: Complete source selection and complete contract award. Manage contractor deliverables and oversee contractor Systems Engineering Technical Reviews (SETR), including IBR, SRR, and SFR.		-	-	-
FY 2019 Base Plans: Review, evaluate and manage contractor deliverables and contractor detailed design effort in preparation for CDR.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: FY2019 funding increase supports modeling and simulation efforts following Milestone B and EM&D.				
Title: Barracuda: Management Services	Articles:	0.000	0.286	0.236
FY 2018 Plans: Provide program management, financial management, and engineering support.		-	-	-
FY 2019 Base Plans: Continue to provide program management, financial management, and engineering support.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement:				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018								
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2989 / Barracuda										
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
FY2019 funding increase supports modeling and simulation efforts following Milestone B and EM&D.																		
Accomplishments/Planned Programs Subtotals										0.000	20.761	31.282	0.000	31.282				
C. Other Program Funding Summary (\$ in Millions)																		
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost							
• 0604373N/2473: Airborne Mine Countermeasures	7.357	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.357							
Remarks																		
Barracuda FY17 funding in budget PE 0604373N and realigned to PE 0603502N in FY18 - FY23.																		
D. Acquisition Strategy																		
Transition ONR FNC SS DTE to Barracuda in FY17 and FY18 following the same approach to design a low cost modular neutralizer that leverages economies of scale and reduces total ownership cost. Release the Barracuda RFP in 3QFY17. Achieve Milestone B in 2QFY18. Award a cost plus incentive fee base contract to design and deliver 750 Engineering Development Models (EDMs) with two cost plus fixed fee Low Rate Initial Production (LRIP) options to manufacture and deliver 1000 Barracudas per option. Base award will occur in 3QFY18. LRIP option #1 planned to be exercised in FY25 and LRIP option #2 in FY26. Manage the production cost model throughout the detailed design effort to deliver a low cost design in the Technical Data Package (TDP). There will be Government Purpose Rights on the TDP that will enable release of the TDP for a full and open competition of the Full Rate Production (FRP) contract planned in FY27. Initial Operating Capability (IOC) planned for 4QFY25.																		
E. Performance Metrics																		
Efficient design, fabrication, and testing to deliver a low cost solution that achieves required probability of kill against near surface mines.																		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2989 / Barracuda							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Barracuda Hardware/Support	C/CPIF	TBD : TBD	0.000	0.000		16.118	May 2018	25.879	May 2019	-		25.879	0.000	41.997	-
Subtotal			0.000	0.000		16.118		25.879		-		25.879	0.000	41.997	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Barracuda Engineering Support	WR	NUWC NPT : Newport, RI	0.000	0.000		0.544	Dec 2017	0.549	Dec 2018	-		0.549	Continuing	Continuing	Continuing
Barracuda Engineering Services	C/CPIF	JHU APL : Baltimore, MD	0.000	0.000		0.668	Dec 2017	0.826	Nov 2018	-		0.826	Continuing	Continuing	Continuing
Barracuda Engineering Support	WR	NSWC, PC : Panama City, FL	0.000	0.000		1.341	Nov 2017	1.472	Nov 2018	-		1.472	Continuing	Continuing	Continuing
Barracuda Support	WR	NSWC, IHD : Indian Head, MD	0.000	0.000		1.357	Dec 2017	1.432	Nov 2018	-		1.432	0.000	2.789	-
Barracuda Support	WR	Naval Research Lab : Washington, DC	0.000	0.000		0.193	Dec 2017	0.578	Jan 2019	-		0.578	0.000	0.771	-
Barracuda Support	WR	NSWC, Carderock : Bethesda, MD	0.000	0.000		0.254	Dec 2017	0.310	Jan 2019	-		0.310	0.000	0.564	-
Subtotal			0.000	0.000		4.357		5.167		-		5.167	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Barracuda Management Support	WR	NSWC, PC : Panama City, FL	0.000	0.000		0.286	Dec 2017	0.236	Dec 2018	-		0.236	0.000	0.522	-
Subtotal			0.000	0.000		0.286		0.236		-		0.236	0.000	0.522	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018			
Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)						
1319 / 4			PE 0603502N / Surface & Shallow Water MCM			2989 / Barracuda						
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		20.761		31.282		-	31.282	Continuing	Continuing	N/A
<u>Remarks</u>												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603502N / *Surface & Shallow Water
MCM*

Project (Number/Name)
2989 / Barracuda

Proj 2989	FY 2017					FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
Acquisition Milestones																															
Barracuda Acquisition Documentation	Acquisition Documentation				Milestone B Decision	▲	E&MD Contract Award	▲																							
Barracuda Design Reviews																	PDPR	▲	CDR	▲											
System Development																															
Barracuda	Barracuda Development																														
Test and Evaluation																															
Development Testing (DT)	Development Testing (DT)																									Development Testing (DT)					
System Deliveries																															
Engineering Development Model Delivery																											EDM				
																											EDM Delivery	▲			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2989 / Barracuda		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 2989</i>				
Acquisition Milestones: Barracuda Acquisition Documentation: Acquisition Documentation		1	2017	1
Acquisition Milestones: Barracuda Acquisition Documentation: Milestone B Decision		2	2018	2
Acquisition Milestones: Barracuda Acquisition Documentation: Contract Award		3	2018	3
Acquisition Milestones: Barracuda Design Reviews: Preliminary Design Review		1	2020	1
Acquisition Milestones: Barracuda Design Reviews: Critical Design Review		1	2021	1
System Development: Barracuda: Barracuda Development		1	2017	4
Test and Evaluation: Development Testing (DT): Development Testing (DT): Development Testing (DT)		1	2023	4
System Deliveries: Engineering Development Model Delivery: Engineering Development Model Delivery		2	2021	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3123 / SMCM UUV			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3123: SMCM UUV	135.530	20.890	25.052	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	181.472
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

Note
FY 2019 and future funding for Project 3123 is in Program Element (PE) 0604028N. Project realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

In order to accelerate future capability and support steady growth of the fleet's UUV Family of Systems (FoS) the Knifefish Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) program develops new, advanced Unmanned Undersea Vehicles (UUVs) to support clandestine mine detection capability against volume, bottom, and buried mines. Equipment includes vehicles and associated systems support equipment. In parallel, Pre-Planned Product Improvement (P3I) design efforts are ongoing to support insertion of incremental capability when the technology is ready. Planned P3I candidates being considered include increased detection range capability, communications upgrades, on-board sonar processing and target recognition, command and control improvements, and other smaller tasks.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Title: Knifefish SMCM UUV	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Complete CT and Developmental Testing (DT)/Operational Assessment (OA). Achieve Milestone C in 3QFY18. Conduct Pre-Planned Product Improvement (P3I) development efforts to increase sonar range by 3x and lay initial foundation for follow-on P3I efforts (onboard processing, re-acquisition, dual-side sonar, and increased endurance). Component fabrication, testing, and initial integration of P3I efforts to increase sonar range.		20.890	25.052	0.000	0.000	0.000
FY 2019 Base Plans: Funding realigned to PE 0604028N.		-	-	-	-	-
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding has been realigned to PE 0604028N.						
Accomplishments/Planned Programs Subtotals		20.890	25.052	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 3123 / SMCM UUV	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/2622: Minesweeping Replacement	26.764	31.531	35.709	-	35.709	55.949	51.338	34.007	16.753	Continuing	Continuing
• OPN/1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,501.531	2,771.262
• RDTEN/0603018N/3123: SMCM UUV	0.000	0.000	16.717	-	16.717	22.747	23.598	24.031	24.031	Continuing	Continuing
Remarks The above OPN funding lines account for several programs, of which the Knifefish program is only a portion.											
D. Acquisition Strategy The Knifefish program was initiated in FY11 to develop Surface Mine Countermeasure Unmanned Undersea Vehicles (SMCM UUV) equipped with advanced Low Frequency Broadband (LFBB) sonar that provides volume, bottom, and buried mine detection capability. Procurement of the SMCM UUV with LFBB will occur after Milestone C.											
E. Performance Metrics Successful Milestone C in 3Q FY 2018 and FRP Decision in FY 2019.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3123 / SMCM UUV							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SMCM UOES Development	C/CPAF	BLUEFIN : CAMBRIDGE, MA	15.142	0.000		0.000		0.000		-		0.000	0.000	15.142	-
Knifefish Development	C/CPIF	Various : Various	17.497	0.000		0.000		0.000		-		0.000	0.000	17.497	-
Knifefish Development & Engineering Support	C/CPIF	General Dynamics AIS : McLeansville, NC	67.124	14.696	Dec 2016	9.134	Dec 2017	0.000		-		0.000	0.000	90.954	-
Hardware/Software Development - Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	2.429	3.000	Dec 2016	1.250	Dec 2017	0.000		-		0.000	0.000	6.679	-
Knifefish P3I Development Contractor	C/CPIF	GDMS : McLeansville, NC	0.000	0.000		4.908	Dec 2017	0.000		-		0.000	0.000	4.908	-
Subtotal		102.192	17.696		15.292		0.000		-		-	0.000	0.000	135.180	N/A
Remarks															
FY 2019 and future funding has been realigned to PE 0604028N.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	WR	NSWC, PC : PANAMA CITY, FL	16.769	2.369	Dec 2016	1.000	Dec 2017	0.000		-		0.000	0.000	20.138	-
Engineering Support	WR	NUWC, Newport : NEWPORT, RI	5.728	0.490	Dec 2016	0.400	Dec 2017	0.000		-		0.000	0.000	6.618	-
Engineering Support	WR	VARIOUS : VARIOUS	4.479	0.313	Dec 2016	1.000	Dec 2017	0.000		-		0.000	0.000	5.792	-
Engineering Support P3I	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.500	Dec 2017	0.000		-		0.000	0.000	0.500	-
Engineering Support P3I	WR	NUWC, Newport : NEWPORT, RI	0.000	0.000		0.250	Dec 2017	0.000		-		0.000	0.000	0.250	-
Engineering Support P3I	WR	VARIOUS : VARIOUS	0.000	0.000		3.800	Dec 2017	0.000		-		0.000	0.000	3.800	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 3123 / SMCM UUV			
Support (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	26.976	3.172		6.950		0.000		-		0.000	0.000	37.098	N/A
Remarks FY 2019 and future funding has been realigned to PE 0604028N.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NOMWC : STENNIS, MS	0.526	0.000		0.000		0.000		-		0.000	0.000	0.526	-
Government T&E Support	WR	VARIOUS : VARIOUS	1.329	0.000		0.920	Dec 2017	0.000		-		0.000	0.000	2.249	-
Test and Evaluation	WR	COMOPTEVFOR : NORFOLK, VA	0.556	0.000		0.160	Dec 2017	0.000		-		0.000	0.000	0.716	-
Government T&E Support	WR	NSWC, PC : PANAMA CITY, FL	0.449	0.000		0.500	Dec 2017	0.000		-		0.000	0.000	0.949	-
		Subtotal	2.860	0.000		1.580		0.000		-		0.000	0.000	4.440	N/A
Remarks FY 2019 and future funding has been realigned to PE 0604028N.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	VARIOUS : WASHINGTON, DC	3.120	0.000		1.105	Feb 2018	0.000		-		0.000	0.000	4.225	-
Travel	WR	NAVSEA : WNY, DC	0.335	0.022	Dec 2016	0.125	Dec 2017	0.000		-		0.000	0.000	0.482	-
Acquisition Workforce	WR	VARIOUS : VARIOUS	0.047	0.000		0.000		0.000		-		0.000	0.000	0.047	-
		Subtotal	3.502	0.022		1.230		0.000		-		0.000	0.000	4.754	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3123 / SMCM UUV							
Management Services (\$ in Millions)			FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Remarks FY 2019 and future funding has been realigned to PE 0604028N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			135.530	20.890		25.052		0.000		-		0.000	0.000	181.472	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

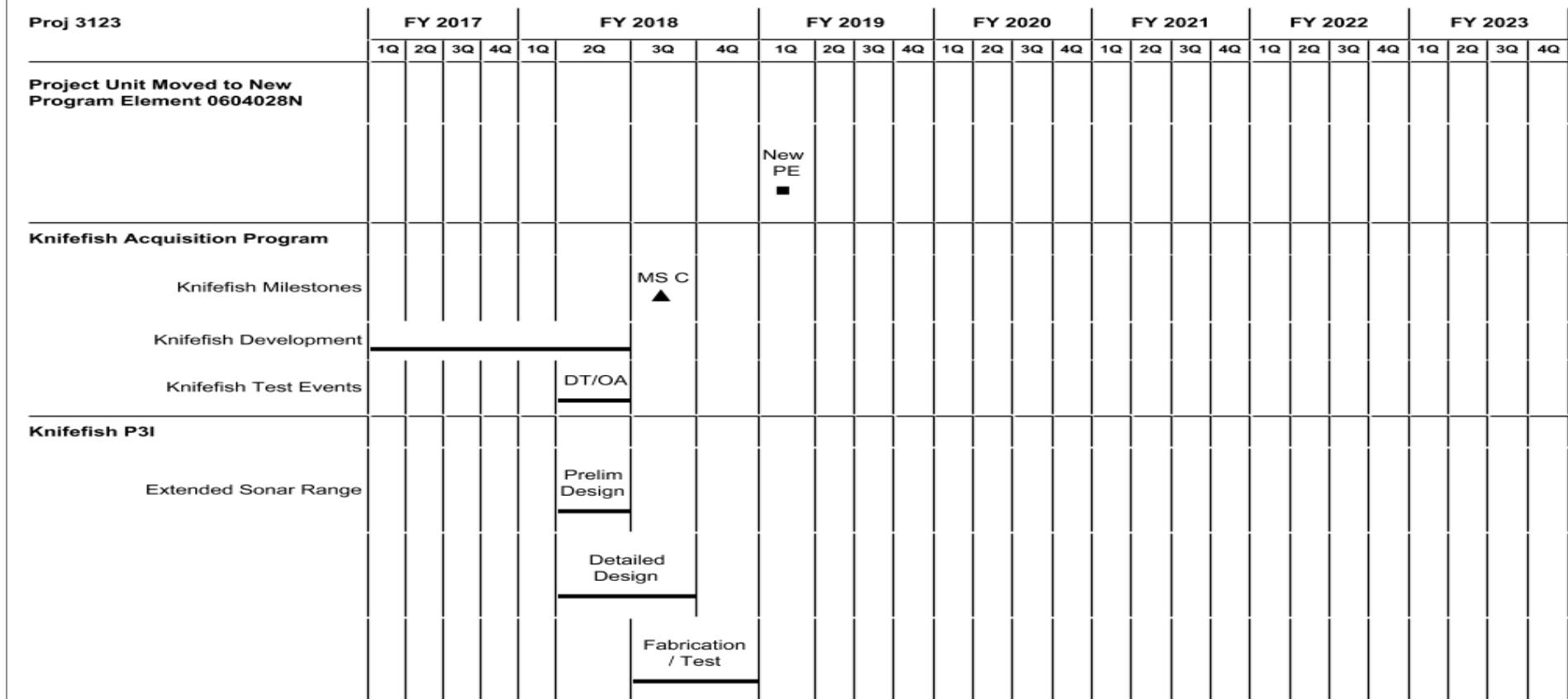
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603502N / Surface & Shallow Water
MCM

Project (Number/Name)
3123 / SMCM UUV



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 3123 / SMCM UUV

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3123				
Project Unit Moved to New Program Element 0604028N:	1	2019	1	2019
Knifefish Acquisition Program: Knifefish Milestones: Milestone C	3	2018	3	2018
Knifefish Acquisition Program: Knifefish Development:	1	2017	2	2018
Knifefish Acquisition Program: Knifefish Test Events: DT/OA	2	2018	2	2018
Knifefish P3I: Extended Sonar Range: Extended Range Prelim Design	2	2018	2	2018
Knifefish P3I: Extended Sonar Range: Extended Range Detailed Design	2	2018	3	2018
Knifefish P3I: Extended Sonar Range: Extended Range Fabrication/Test	3	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603502N / Surface & Shallow Water MCM				3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3428: Medium Displacement Unmanned Surface Vehicle (MDUSV)	0.000	0.000	0.000	2.800	-	2.800	23.900	26.300	30.000	43.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Medium Displacement Unmanned Surface Vehicle (MDUSV) is a new start in FY2019

A. Mission Description and Budget Item Justification

Startup of efforts for the new Medium Displacement USV starting in FY19 which will serve as the unmanned surface vessel portion of the Navy's Future Surface Combatant (FSC) strategy. The FSC USV is intended to provide low-cost, high endurance, reconfigurable ships able to accommodate various payloads for unmanned missions in support of the Navy's Surface Fleet. FSC USVs will be optionally manned and will operate autonomously while collaborating with US Navy combatants. The FSC USVs can be sent forward alone, work as a team, or accompany individual combatants or battle groups. Expected missions include electronic warfare, anti-surface warfare, strike, or others.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Product Development	0.000	0.000	1.900	0.000	1.900
FY 2018 Plans: N/A					
FY 2019 Base Plans: Begin initial concept design efforts and analysis of alternatives planning for FSC USV efforts.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Funding for initial concept design commences in FY19.					
Title: Support	0.000	0.000	0.700	0.000	0.700
FY 2018 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2019 Base Plans: Begin engineering and technical support for future surface combatant (FSC) USV efforts.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding for FSC support commences in FY19.						
Title: Management	Articles:	0.000	0.000	0.200	0.000	0.200
FY 2018 Plans: N/A		-	-	-	-	-
FY 2019 Base Plans: Conduct management and program efforts for future surface combatant (FSC) USV efforts.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding for FSC management commences in FY19.						
Accomplishments/Planned Programs Subtotals		0.000	0.000	2.800	0.000	2.800
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
FSC USV is an ideal candidate for an accelerated acquisition approach and that will be evaluated as an option. Ongoing Medium/Large USV efforts (ACTUV/Sea Hunter and SCO efforts) will serve as Technology Maturation and Risk Reduction efforts. Pre-Milestone A FSC USV activities (requirements document development, conduct of AoA) will provide basis for establishing the Program of Record. Acquisition Strategy, including contracting strategy, will be developed in FY20 to support a notional MS A decision in FY21. Two development contracts will be competitively awarded in FY23 following a notional MS B decision.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)
E. Performance Metrics Successful Milestone A decision in FY21.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)			
Product Development (\$ in Millions)															
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract	
Development Efforts	TBD	Various : Various	0.000	0.000		0.000		1.900	Dec 2018	-	1.900	Continuing	Continuing	Continuing	
		Subtotal	0.000	0.000		0.000		1.900		-	1.900	Continuing	Continuing	N/A	
Support (\$ in Millions)															
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering Support	WR	Various : Various	0.000	0.000		0.000		0.700	Dec 2018	-	0.700	Continuing	Continuing	Continuing	
		Subtotal	0.000	0.000		0.000		0.700		-	0.700	Continuing	Continuing	N/A	
Management Services (\$ in Millions)															
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	C/CPFF	Various : Washington, DC	0.000	0.000		0.000		0.200	Dec 2018	-	0.200	Continuing	Continuing	Continuing	
		Subtotal	0.000	0.000		0.000		0.200		-	0.200	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Project Cost Totals				0.000	0.000		0.000		2.800		-	2.800	Continuing	Continuing	N/A
Remarks New effort starting in FY19 for the USV portion of the Future Surface Combatant.															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018									
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4								PE 0603502N / Surface & Shallow Water MCM								3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)											
Medium Displacement USV	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
Initial Planning and Concept Design Efforts																											
Analysis of Alternatives																											
Acquisition Documentation & Initial Contracts Efforts																											
Award EDM Contract(s)																								▲			
EDM Design Efforts																											
Fleet Experimentation Efforts																											
Payload Development and Experimentation Efforts																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Medium Displacement USV				
Initial Planning and Concept Design Efforts: Schedule Detail	1	2019	2	2020
Analysis of Alternatives: Schedule Detail	2	2020	1	2021
Acquisition Documentation & Initial Contracts Efforts: Schedule Detail	1	2021	3	2023
Award EDM Contract(s): Schedule Detail	3	2023	3	2023
EDM Design Efforts: Schedule Detail	4	2023	4	2023
Fleet Experimentation Efforts: Schedule Detail	3	2020	2	2023
Payload Development and Experimentation Efforts: Schedule Detail	2	2020	2	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603506N / Surface Ship Torpedo Defense								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	679.666	69.872	14.974	8.570	-	8.570	0.000	0.000	0.000	0.000	0.000	773.082	
0225: Surface Ship Torpedo Defense (SSTD)	679.666	69.872	14.974	8.570	-	8.570	0.000	0.000	0.000	0.000	0.000	773.082	

A. Mission Description and Budget Item Justification

The Surface Ship Torpedo Defense (SSTD) program provides a detect-to-engage layered torpedo defense capability. The four major efforts that comprise SSTD are the AN/SLQ-25 (NIXIE) system, Torpedo Warning System (TWS), the Countermeasure Anti-Torpedo (CAT) and Acoustic Device Countermeasure (Surface ADC MK2). CAT and TWS are development programs. The CAT program develops a canisterized Anti-Torpedo Torpedo (ATT). The TWS program develops the required torpedo detection, classification and localization (TDCL) ship systems to employ CAT. The TWS and CAT systems make up the Anti-Torpedo Torpedo Defense System (ATTDS).

The ATTDS provides a hard kill torpedo defense capability on High Value Units (HVU's). The program has developed and fielded five ATTDS Engineering Design Model (EDM) systems on CVNs. Each EDM system is one TWS with a CAT load out of a maximum of eight CATs. The program delivered its first prototype system in FY13 and has delivered and installed its fifth and final system in FY17. Along with delivering and installing systems on CVN's the ATTDS Program completed system salvo software development and a Quick Reaction Assessment (QRA) test in 1QFY18. The AN/SLQ-25 (NIXIE) is a towed acoustic and non-acoustic countermeasure system. The AN/SLQ-25 program develops countermeasure technologies and capabilities to improve ship survivability against future torpedo threats.

Research and development of new technologies and capabilities developed under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives. New and emerging hardware and software are evaluated in representative acoustic environments, against projected threats through both digital and hardware-in-the-loop simulations, to determine their effectiveness and impact on improving ship survivability. The technology is then incorporated into the appropriate product line.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	87.066	14.974	8.570	-	8.570
Current President's Budget	69.872	14.974	8.570	-	8.570
Total Adjustments	-17.194	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.681	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Congressional Directed Reductions	-15.513	-	-	-	-
Adjustments					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603506N / Surface Ship Torpedo Defense				0225 / Surface Ship Torpedo Defense (SSTD)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0225: Surface Ship Torpedo Defense (SSTD)	679.666	69.872	14.974	8.570	-	8.570	0.000	0.000	0.000	0.000	0.000	773.082
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Countermeasure Anti- Torpedo (CAT) program developed a canisterized Anti-Torpedo Torpedo (ATT). The Torpedo Warning System (TWS) developed the required torpedo detection, classification and localization (TDCL)systems. The Countermeasure TWS and CAT systems make up the Anti-Torpedo Torpedo Defense System (ATTDS).

The ATTDS provides a hard kill torpedo defense capability on High Value Units (HVU's). The program has developed and fielded five ATTDS Engineering Design Model (EDM) systems on CVNs. Each EDM system is one TWS with a CAT load out of a maximum of eight CATs. The program delivered its first prototype system in FY13 and has delivered and installed its fifth and final system in FY17. Along with delivering and installing systems on CVN's the ATTDS Program completed system salvo software development and a Quick Reaction Assessment (QRA) test in 1QFY18.

In FY18, no program of record acquisition milestones were pursued. In FY19, software support, material engineering changes, and system reliability will remain the programs top priorities to ensure the highest operational availability and performance of the systems.

Research and development of new technologies and capabilities developed under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives. New and emerging hardware and software are evaluated in representative acoustic environments, against projected threats through both digital and hardware-in-the-loop simulations, to determine their effectiveness and impact on improving ship survivability. The technology is then incorporated into the appropriate product line.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<i>Title:</i> Countermeasure Anti-Torpedo (CAT) <i>FY 2018 Plans:</i> Continue land based reliability testing on returning deployed ATTs. Continue engineering changes on CAT materials and CAT software upgrades. Perform Safety Certifications prior to two FY18 CVN deployments. Deliver Ready for Issue CATs for two FY18 CVN deployments. Support software resolution through Program Trouble Reports (PTRs).	23.452 Articles: 24	7.000 - -	3.600 - -	0.000 - -	3.600 - -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense	Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Conduct Quick Reaction Assessment (QRA) of salvo software. Conduct CT-5 contractor test.						
FY 2019 Base Plans: Continue land based reliability testing on returning deployed ATTs. Continue engineering changes on CAT materials and CAT software upgrades. Support software resolution through Program Trouble Reports (PTRs).						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 18 to FY 19 decrease due to planned phasing of testing and support events.						
Title: Torpedo Warning System (TWS)	Articles:	46.420	7.974	4.970	0.000	4.970
FY 2018 Plans: Continue land based reliability testing on returning deployed TWS systems. Continue engineering changes on TWS software upgrades. Perform Safety Certifications prior to two FY18 CVN deployments. Perform system operational verification testing prior to two FY18 CVN deployments. Support software resolution through Program Trouble Reports (PTRs). Complete RORO to EDM conversion on CVN69.	-	-	-	-	-	-
FY 2019 Base Plans: Continue land based reliability testing on returning deployed TWS systems. Continue engineering changes on TWS software upgrades. Support software resolution through Program Trouble Reports (PTRs).						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 18 to FY 19 decrease due to planned phasing of testing and support events.						
Accomplishments/Planned Programs Subtotals		69.872	14.974	8.570	0.000	8.570

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense						Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/2213: SSTD	6.893	12.867	11.277	-	11.277	12.831	13.104	13.349	13.636	Continuing	Continuing
• WPN/3113: SSTD	5.910	5.240	6.353	-	6.353	5.712	5.766	5.673	5.550	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
CAT Program: The Program completed a Systems Requirements Review (SRR) and Preliminary Design Review (PDR) on the Engineering Development Model (EDM) design. ARL Penn State (ARL/PSU) has completed a Technical Data Package (TDP) that can be used in the future system builds. Funding in FY18 was used to complete QRA of salvo software and conduct CT-5 contract test, update and refine the CATs to ensure they were ready for fleet use. Funding in FY19 is for EDM support and ATT post deployment EDM maintenance.											
TWS Program: Development and production of the new sensors was conducted by ULTRA/3Phoenix. Five complete sensor sets have been delivered. Ready-stowage racks, and fire control systems have been developed by Pacific Engineering Incorporated (PEI) and In-Depth Engineering, respectively. System integration supported fabrication and fielding of the five complete systems. Funding in FY18 was used to update and refine TWS to ensure the five systems were ready for Fleet deployment. Funding in FY19 is for EDM support and TWS post deployment software and hardware engineering review.											
E. Performance Metrics											
Torpedo Effectiveness for the CAT											
Torpedo Reliability and Availability for the CAT											
Torpedo Detection Classification and Localization (TDCL)											
False Alert Rate TDCL probability of correct classification											
TWS System Reliability and Availability											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NUWC : Newport, RI	44.311	3.620	Nov 2016	2.400	Nov 2017	1.100	Nov 2018	-		1.100	0.000	51.431	-
Systems Engineering ATT Dev.	C/CPFF	PSU/ARL : State College, PA	281.016	21.227	Dec 2016	4.000	Dec 2017	2.000	Dec 2018	-		2.000	0.000	308.243	-
Systems Engineering	C/CPFF	JHU/APL : Baltimore , MD	1.740	0.000		0.000		0.000		-		0.000	0.000	1.740	-
Systems Engineering Warhead Dev.	WR	NSWC : Indian Head, MD	73.700	5.490	Nov 2016	1.100	Nov 2017	1.100	Nov 2018	-		1.100	0.000	81.390	-
Systems Engineering	WR	NUWC : Keyport, WA	53.982	5.649	Nov 2016	1.000	Nov 2017	1.200	Nov 2018	-		1.200	0.000	61.831	-
Systems Engineering TDCL	C/CPFF	Ultra : Braintree, MA	11.640	0.000		0.000		0.000		-		0.000	0.000	11.640	Continuing
Systems Engineering ATT	WR	ONR : Arlington, VA	1.680	0.000		0.000		0.000		-		0.000	0.000	1.680	-
Systems Engineering TDCL	C/CPFF	AAC : Hauppauge, NY	4.480	0.000		0.000		0.000		-		0.000	0.000	4.480	Continuing
Systems Engineering	WR	OPTEVFOR : Norfolk, VA	2.090	0.340	Feb 2017	0.000		0.000		-		0.000	0.000	2.430	-
Systems Engineering	C/CPFF	ArgonST : Manassas, VA	0.800	0.000		0.000		0.000		-		0.000	0.000	0.800	Continuing
Systems Engineering TDCL	WR	NSWC : Dahlgren, VA	9.865	0.167	Nov 2016	0.000		0.000		-		0.000	0.000	10.032	Continuing
Systems Engineering TDCL	WR	SPAWAR : San Diego, CA	10.148	0.970	Dec 2016	0.000		0.000		-		0.000	0.000	11.118	Continuing
Systems Engineering	C/CPFF	UT/ARL : Arlington, TX	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	Continuing
Systems Engineering	C/CPFF	Aliion : Bridgeport, CT	14.858	0.000		0.000		0.000		-		0.000	0.000	14.858	Continuing
Systems Engineering	WR	NUWC DET : Norfolk, VA	33.181	8.600	Dec 2016	0.000		0.000		-		0.000	0.000	41.781	-
Systems Development	C/CPFF	3 Phoenix : Fairfax, VA	103.545	19.000	Dec 2016	3.974	Dec 2017	1.100	Dec 2018	-		1.100	0.000	127.619	Continuing
Integrated Logistic Spt	WR	NSWC Crane : Crane, IN	1.064	0.049	Dec 2016	0.000		0.000		-		0.000	0.000	1.113	Continuing
Systems Engineering	C/CPFF	PEI : Roca, NE	3.745	1.000	Dec 2016	0.000		0.000		-		0.000	0.000	4.745	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	CARDEROCK : Bethesda, MD	1.335	0.295	Dec 2016	0.000		0.000		-		0.000	0.000	1.630	-
Systems Engineering	C/CPFF	CGI : Washington, DC	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
Systems Engineering	C/BA	Dam Neck : Virginia Beach, VA	0.022	0.000		0.000		0.000		-		0.000	0.000	0.022	-
Systems Engineering	C/BA	NSWC Panama City : Panama City, FL	0.255	0.000		0.000		0.000		-		0.000	0.000	0.255	-
Systems Engineering	C/BA	Devron 26 : Not Specified	0.139	0.000		0.000		0.000		-		0.000	0.000	0.139	-
Systems Engineering	WR	Puget Sounds : Norfolk, VA	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
Systems Engineering	WR	NAVAIR (NAWC WD) : Patuxent River, MD	0.000	0.140	Dec 2016	0.000		0.000		-		0.000	0.000	0.140	-
Systems Engineering	WR	NORFOLK SHIPYARD : Norfolk, VA	0.000	0.150	Dec 2016	0.000		0.000		-		0.000	0.000	0.150	-
Systems Engineering	WR	NORFOLK PLANNING YARD : Norfolk, VA	0.000	0.090	Dec 2016	0.000		0.000		-		0.000	0.000	0.090	-
Subtotal		654.596	66.787		12.474		6.500		-		6.500	0.000	740.357	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Earned Value Mgmt Spt	C/CPAF	Pioneer : Virigina	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	-
Program Management Support	C/FFP	EG&G : Gaithersburg, Md.	2.846	0.000		0.000		0.000		-		0.000	0.000	2.846	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense				Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DAWDF	Various	Not Specified : Not Specified	0.237	0.000		0.000		0.000		-		0.000	0.000	0.237	Continuing
Program Management Support	C/CPAF	Tech-Marine : Washington, DC	9.930	0.000		0.000		0.000		-		0.000	0.000	9.930	Continuing
Travel	Various	PMS 415 : Not Specified	1.044	0.100	Nov 2016	0.100	Nov 2017	0.100	Nov 2018	-		0.100	0.000	1.344	Continuing
Program Management Support	C/CPFF	SPA : Alexandria, VA	0.575	0.000		0.000		0.000		-		0.000	0.000	0.575	Continuing
Program Management Support	C/CPAF	Booz Allen : Washington, DC	9.988	2.985	Feb 2017	2.400	Feb 2018	1.970	Feb 2019	-		1.970	0.000	17.343	-
Program Management Support	C/CPAF	Alion : Washington, DC	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Subtotal			25.070	3.085		2.500		2.070		-		2.070	0.000	32.725	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			679.666	69.872		14.974		8.570		-		8.570	0.000	773.082	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)								
1319 / 4								PE 0603506N / Surface Ship Torpedo Defense								0225 / Surface Ship Torpedo Defense (SSTD)								
Proj 0225	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
	EX-819 CONTAINER																							
TWS TAAS In Water Test					RORO to EDM USS CVN 69																			
					CAT - SALVO At-Sea Integration Test 2																			
				CAT - PCA		CAT - Integration ECP																		
					TWS - Integration ECP																			

2019PB - 0603506N - 0225

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603506N / Surface Ship Torpedo Defense	Project (Number/Name) 0225 / Surface Ship Torpedo Defense (SSTD)		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 0225</i>				
EX-819 CONTAINER		2	2017	4
RORO to EDM USS CVN 69		4	2017	3
TWS - TAAS In Water Test		1	2017	1
CAT - SALVO At-Sea Integration Test 2		1	2018	2
CAT - Integration ECP		1	2018	4
CAT - PCA		2	2017	4
TWS - Integration ECP		1	2018	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603512N / Carrier Systems Development								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	61.644	7.516	9.296	5.440	-	5.440	5.401	5.531	5.637	5.778	Continuing	Continuing	
3216: <i>Tactical Support Center-Integration</i>	36.849	6.943	7.636	4.248	-	4.248	4.385	4.483	4.566	4.670	Continuing	Continuing	
4005: <i>In-Service Carrier Systems Development</i>	24.795	0.573	1.660	1.192	-	1.192	1.016	1.048	1.071	1.108	Continuing	Continuing	

A. Mission Description and Budget Item Justification

The FY 2019 funding request was reduced by \$.033 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

- (3216) - The AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC) delivers Anti-Submarine Warfare (ASW) and Surface Warfare (SUW) combat capability to the Aircraft Carrier. CV-TSC integrates sensor data from Off-Board Aircraft, Organic Platform Sensors, Link-16 Track Data, Ship Self Defense System (SSDS) Track Data, Global Command and Control System (GCCS) Over-the-Horizon Track Data, and Environmental and Threat Databases to assess the threat and assist the Tactical Action Officer (TAO) and Composite Warfare Commander (CWC) to effectively employ overall CVN self-defense capabilities. CV-TSC generates real-time ASW/SUW information and recommendations, tactical planning and employment of ASW/SUW aircraft, ASW/SUW sensor data processing and analysis, and distribution of tactically significant data. Aircraft supported include: MH-60R/S, P-8, MQ-4C Triton, and future ASW/SUW aircraft.

Beginning in FY 2016 and concluding in FY 2018, Project 3216 is supporting the design and development of a multi-application, cross-platform defense capability as directed by the Chief of Naval Operations (CNO) and Assistant Secretary of the Navy Research, Development & Acquisition (ASN (RDA)) via the Task Force Cyber Awakening (TFCA) Advisory Board.

- (4005) - The In-Service Carrier Systems Development Demonstration and Validation program exploits available technologies to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs (TOC).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	7.605	9.296	5.918	-	5.918
Current President's Budget	7.516	9.296	5.440	-	5.440
Total Adjustments	-0.089	0.000	-0.478	-	-0.478
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.089	0.000			
• Program Adjustments	0.000	0.000	-0.033	-	-0.033
• Rate/Misc Adjustments	0.000	0.000	-0.445	-	-0.445
Change Summary Explanation					
Funding: The net FY 2019 decrease is based on the Project 3216 Boundary Defense Capability (BDC) efforts concluding in this PE. However, the FY 2019 planned increase to the Project 3216 CV-TSC budget is the result of additional efforts initiated in FY 2019 (i.e. definition and development for FCR-4).					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4				PE 0603512N / Carrier Systems Development				3216 / Tactical Support Center-Integration				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3216: <i>Tactical Support Center-Integration</i>	36.849	6.943	7.636	4.248	-	4.248	4.385	4.483	4.566	4.670	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The CV-TSC project delivers ASW and SUW combat capability to the Aircraft Carrier. CV-TSC integrates sensor data from Off-Board Aircraft, Organic Platform Sensors, Link-16 Track Data, SSDS Track Data, Global Command and Control System (GCCS) Over-the-Horizon Track Data, and Environmental and Threat Databases to assess the threat and assist the TAO and CWC to effectively employ overall CVN self-defense capabilities. CV-TSC generates real-time ASW/SUW information and recommendations, tactical planning and employment of ASW/SUW aircraft, ASW/SUW sensor data processing and analysis, and distribution of tactically significant data. Aircraft supported include: MH-60R/S, P-8, MQ-4C Triton, and future ASW/SUW aircraft. System development is accomplished through the following initiatives:

- 1) Maintaining interoperability with the local CVN warfare systems through current and future interfaces;
- 2) Continuing to support mission data exchange and tactical control with current and future ASW/SUW aircraft and their mission systems;
- 3) Improving track and sensor processing and analysis techniques as new track and sensor data becomes available;
- 4) Improving mission planning support for the ASW/SUW missions conducted from the CVN;
- 5) Improving data recording, reconstruct, and distribution to meet the decreasing timelines associated with getting tactically significant data to other end users both on and off platform;
- 6) Improving embedded simulation and training capabilities to enable operator proficiencies; and
- 7) Implementing cyber-security measures.

This project also provides development of Boundary Defense Capability (Cybersecurity) capabilities (from FY 2016 to FY 2018): The purpose of this effort is to define and develop enterprise Hull Mechanical & Electrical (HM&E) System cybersecurity solutions that will provide: protections from cyber-attacks such as boundary defense capabilities that will protect threats entering and leaving HM&E systems, physical protections, message authentication and encryption methods; Detection solutions for system anomalies and attacks at the boundaries, on hosts, networks and backplanes; and provide for operator awareness (e.g. malware detection, file integrity verification, etc.); Reaction solutions that will enable operator and system responses to an attacks; and Recovery methods that will enable for a system to quickly get back to a good known state. Planning will also commence for the integration of cyber solutions into specific HM&E control systems (e.g. Machinery Control, Steering Control, etc.).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: CV-TSC Development / Integration / Test / Certification					3.731	4.222	4.248	0.000	4.248

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development	Project (Number/Name) 3216 / Tactical Support Center-Integration				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: CV-TSC's evolutionary acquisition approach to developing, testing, certifying, and fielding system upgrades and cyber-security patches is implemented through phased Fleet Capability Releases (FCR).						
FY 2018 Plans: <ul style="list-style-type: none"> - Complete the requirements definition phase for FCR-3 and commence the system engineering for and development of FCR-3. - Conduct incremental requirements, design, and test reviews of FCR-3. - Update System Engineering Plan (SEP). - Transition requirements into a systems engineering modeling tool. - Modify interface requirement specifications for changing interfaces. - Start the Transition Information Assurance (IA) Accreditation to Risk Management Framework (RMF). 						
FY 2019 Base Plans: <ul style="list-style-type: none"> - Complete the development phase for FCR-3. - Initiate the requirements definition phase and development efforts for FCR-4. - Complete certifications required for fielding, to include IA Accreditation, ISNS and CANES Certifications, PEO IWS Element Certification, and CST Certification. - Complete the Transition Information Assurance (IA) Accreditation to Risk Management Framework (RMF). Prioritize capability improvements to Public Key Enforcement (PKE) compliance, interoperability with multiple variants of SSDS PLA, and the Common Data Link System (CDLS) multilink. 						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 planned increase is the result of additional efforts initiated in FY 2019 (i.e. definition and development for FCR-4) and is attributable to general inflation rate adjustments.						
Title: NAVSEA Boundary Defense Capability (Cybersecurity)	Articles:	3.212	3.414	0.000	0.000	0.000
Description: The purpose of this effort is to define and develop enterprise Hull Mechanical & Electrical (HM&E) System cybersecurity solutions that will provide: protections from cyber-attacks such as boundary defense capabilities that will protect threats entering and leaving HM&E systems, physical protections, message		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development		Project (Number/Name) 3216 / Tactical Support Center-Integration		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
authentication and encryption methods; Detection solutions for system anomalies and attacks at the boundaries, on hosts, networks and backplanes; and provide for operator awareness (e.g. malware detection, file integrity verification, etc.); Reaction solutions that will enable operator and system responses to an attacks; and Recovery methods that will enable for a system to quickly get back to a good known state. Planning will also commence for the integration of cyber solutions into specific HM&E control systems (e.g. Machinery Control, Steering Control, etc.).						
The development of a cyber-resilient HM&E architecture will include the integration of cybersecurity solutions and system engineering processes to individual HM&E Systems and their Components to ensure a consistent cyber security posture across the entire HM&E Enclave. Development of enterprise HM&E risk management processes will occur, to include the following: a vulnerability assessment and management process across the HM&E Enclave and a methodology to support the execution of the Risk Management Framework and Cybersafe Assessments.						
FY 2018 Plans: Continue design and development of multi-application, cross-platform cybersecurity solutions for control system enclaves, followed by engineering for CVN 68 Class integration. - Initiate non-recurring engineering efforts for HM&E Control Systems. - Perform engineering and planning for Boundary Defense Capability Temporary Alterations. - Develop infra-structure, processes and procedures in support of Risk Management Framework (RMF) and Cybersafe. - Perform system change engineering and analysis for upgrading systems to supported operating systems. - Develop Cybersecurity Situational Awareness strategy for CVN 68 Class						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2019 decrease is based on BDC efforts concluding in this PE.						
Accomplishments/Planned Programs Subtotals			6.943	7.636	4.248	0.000
						4.248

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development						Project (Number/Name) 3216 / Tactical Support Center-Integration	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/2176: Undersea Warfare Support Equipment (N98/CV-TSC only)	0.315	0.338	0.334	-	0.334	0.343	0.353	0.359	0.367	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
CV-TSC Development/Integration: CV-TSC utilizes an incremental development approach that aims to deliver frequent capability updates to the Fleet. This approach allows required capability to be delivered to address emerging Fleet needs and provides frequent opportunities to ensure interoperability is synchronized with the Ship Self Defense System (SSDS) Advanced Capability Builds (ACBs). The acquisition strategy places heavy emphasis on the use of open architecture best practices to ensure ease of upgrades and to make developed products available to other platforms.											
NAVSEA Boundary Defense Capability (Cybersecurity): Investigate, demonstrate, and implement multi-application, cross-platform cybersecurity solutions for HM&E control system enclaves, followed by engineering for CVN 68 Class integration. Execute non-recurring engineering efforts for HM&E Control Systems. Perform engineering and planning for Boundary Defense Capability Temporary Alterations.											
E. Performance Metrics											
CV-TSC Development/Integration: - Achieve Configuration Control Board (CCB) certification for installation of CV-TSC Build 8.0 software version. - Achieve Platform Information Technology (PIT) Information Assurance (IA) accreditation of CV-TSC Build 8.0 software version. - Achieve Consolidate Afloat Network Enterprise System (CANES) interoperability certification of CV-TSC Build 8.0 software version. - Achieve element certification of CV-TSC Build 8.0 software version. - Achieve Combat System test certification of CV-TSC Build 8.0 software version.											
NAVSEA Boundary Defense Capability (Cybersecurity): - Define and develop cross-platform control system cybersecurity requirements. - Define and develop cross-platform control system cybersecurity risk management processes. - Define and develop a set of cross-platform control system cybersecurity boundary defense solutions. - Define and develop a set of cross-platform, centralized, systems-level cybersecurity solutions. - Define and develop a set of cross-platform, element-level cybersecurity protections.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development					Project (Number/Name) 3216 / Tactical Support Center-Integration						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering / H/W & S/W Devel / Integration	WR	NAWC/Pax River : MD	0.875	0.100	Nov 2016	0.100	Nov 2017	0.100	Nov 2018	-		0.100	Continuing	Continuing	Continuing
Engineering / H/W & S/W Devel / Integration	WR	NRL : DC	0.325	0.000		0.000		0.000		-		0.000	0.000	0.325	-
Engineering / H/W & S/W Devel / Integration	WR	NSWC/Carderock : MD	2.250	0.400	Jan 2017	0.400	Nov 2017	0.000		-		0.000	0.000	3.050	-
Engineering / H/W & S/W Devel / Integration	WR	NSWC/Dahlgren : VA	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
Engineering / H/W & S/W Devel / Integration	WR	NUWC/Keyport : WA	20.770	2.248	Nov 2016	2.541	Oct 2017	2.846	Nov 2018	-		2.846	Continuing	Continuing	Continuing
System Eng / S/W Development	C/CPFF	Adaptive Methods : VA	2.654	0.453	Dec 2016	0.563	Dec 2017	0.595	Dec 2018	-		0.595	Continuing	Continuing	Continuing
System Eng / S/W Development	C/CPFF	JHU/APL : MD	0.250	0.000		0.000		0.000		-		0.000	0.000	0.250	-
System Eng / S/W Development	WR	SPAWAR : CA	4.160	0.000		0.000		0.000		-		0.000	0.000	4.160	-
Engineering / H/W & S/W Development	C/CPFF	VAR* : VAR*	1.038	0.250	Jan 2017	0.338	Dec 2017	0.338	Dec 2018	-		0.338	Continuing	Continuing	Continuing
Boundary Defense Capability Design/Development	WR	NSWC/Philadelphia : PA	1.026	1.500	Oct 2016	1.520	Dec 2017	0.000		-		0.000	0.000	4.046	-
Boundary Defense Capability Design/Development	C/CPFF	VAR* : VAR*	0.930	1.712	Dec 2016	1.894	Jan 2018	0.000		-		0.000	0.000	4.536	-
Subtotal			34.378	6.663		7.356		3.879		-		3.879	Continuing	Continuing	N/A

Remarks

*Consists of multiple performing activities with funding for each not greater than \$1M per year.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development				Project (Number/Name) 3216 / Tactical Support Center-Integration							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Certification	WR	NUWC//Keyport : WA	1.880	0.225	Nov 2016	0.225	Oct 2017	0.314	Nov 2018	-		0.314	Continuing	Continuing	Continuing
Test and Certification	WR	NUWC/Newport : RI	0.125	0.000		0.000		0.000		-		0.000	0.000	0.125	-
Subtotal			2.005	0.225		0.225		0.314		-		0.314	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPIAF	BAE Systems : MD	0.411	0.000		0.000		0.000		-		0.000	0.000	0.411	-
Program Management Support	C/CPIF	CGI Federal : VA	0.055	0.055	Nov 2016	0.055	Nov 2017	0.055	Dec 2018	-		0.055	Continuing	Continuing	Continuing
Subtotal			0.466	0.055		0.055		0.055		-		0.055	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			36.849	6.943		7.636		4.248		-		4.248	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

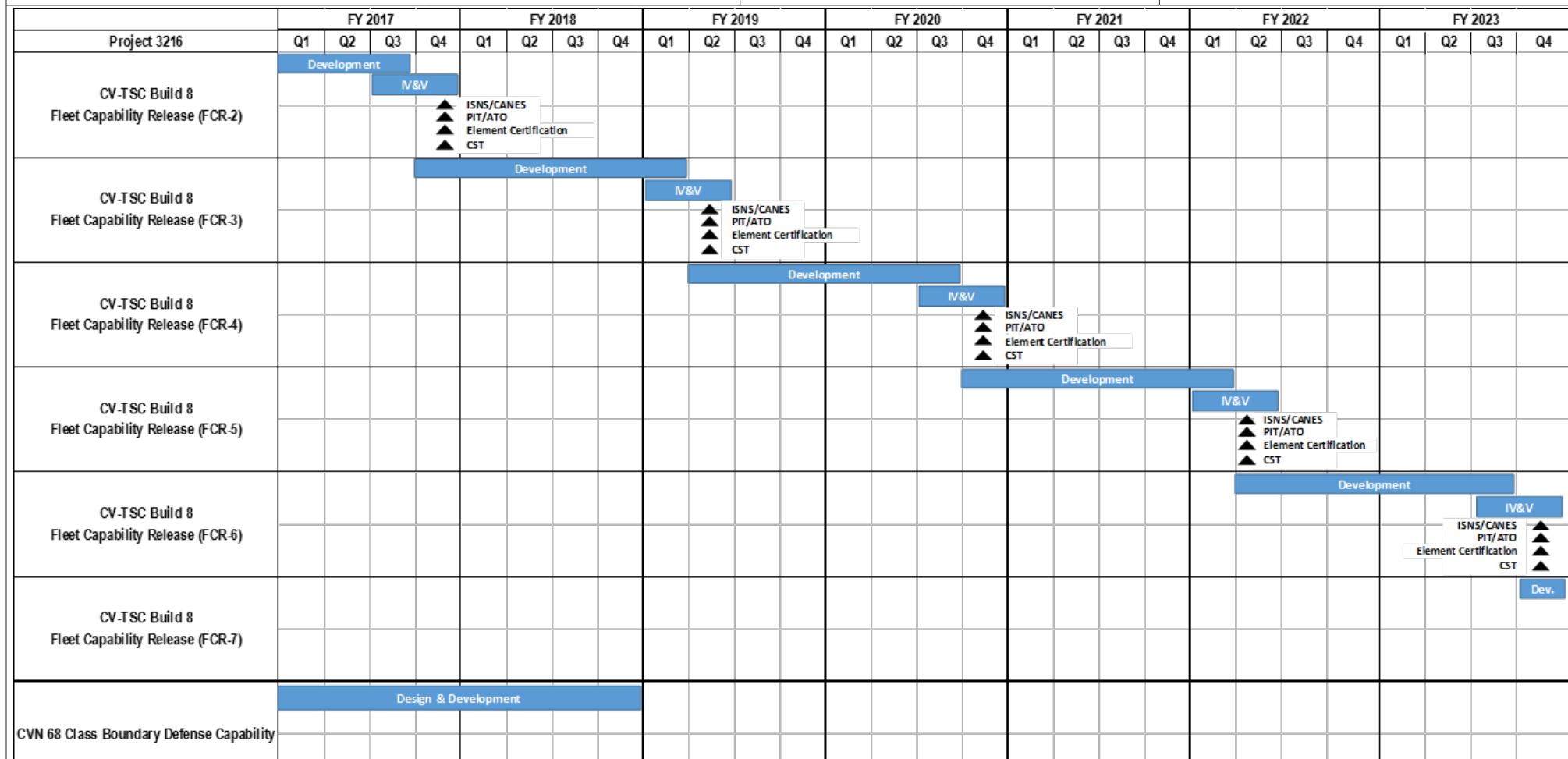
Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603512N / *Carrier Systems
Development*

Project (Number/Name)

3216 / *Tactical Support Center-Integration*



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development	Project (Number/Name) 3216 / Tactical Support Center-Integration

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CV-TSC Build 8 Software Fleet Capability Release				
CV-TSC Build 8 FCR-2: CV-TSC Build 8 FCR-2 Development	1	2017	3	2017
CV-TSC Build 8 FCR-2: CV-TSC Build 8 FCR-2 IV&V	3	2017	4	2017
CV-TSC Build 8 FCR-2: CV-TSC Build 8 FCR-2 PIT/ATO	4	2017	4	2017
CV-TSC Build 8 FCR-2: CV-TSC Build 8 FCR-2 ISNS / CANES Certification	4	2017	4	2017
CV-TSC Build 8 FCR-2: CV-TSC Build 8 FCR-2 Element Certification	4	2017	4	2017
CV-TSC Build 8 FCR-2: CV-TSC Build 8 FCR-2 CVN-78 Combat System Test (CST)	4	2017	4	2017
CV-TSC Build 8 FCR-3: CV-TSC Build 8 FCR-3 Development	4	2017	1	2019
CV-TSC Build 8 FCR-3: CV-TSC Build 8 FCR-3 IV&V	1	2019	2	2019
CV-TSC Build 8 FCR-3: CV-TSC Build 8 FCR-3 PIT/ATO	2	2019	2	2019
CV-TSC Build 8 FCR-3: CV-TSC Build 8 FCR-3 ISNS / CANES Certification	2	2019	2	2019
CV-TSC Build 8 FCR-3: CV-TSC Build 8 FCR-3 Element Certification	2	2019	2	2019
CV-TSC Build 8 FCR-3: CV-TSC Build 8 FCR-3 Combat System Test (CST)	2	2019	2	2019
CV-TSC Build 8 FCR-4: CV-TSC Build 8 FCR-4 Development	2	2019	3	2020
CV-TSC Build 8 FCR-4: CV-TSC Build 8 FCR-4 IV&V	3	2020	4	2020
CV-TSC Build 8 FCR-4: CV-TSC Build 8 FCR-4 PIT/ATO	4	2020	4	2020
CV-TSC Build 8 FCR-4: CV-TSC Build 8 FCR-4 ISNS / CANES Certification	4	2020	4	2020
CV-TSC Build 8 FCR-4: CV-TSC Build 8 FCR-4 Element Certification	4	2020	4	2020
CV-TSC Build 8 FCR-4: CV-TSC Build 8 FCR-4 Combat System Test (CST)	4	2020	4	2020
CV-TSC Build 8 FCR-5: CV-TSC Build 8 FCR-5 Development	4	2020	1	2022
CV-TSC Build 8 FCR-5: CV-TSC Build 8 FCR-5 IV&V	1	2022	2	2022
CV-TSC Build 8 FCR-5: CV-TSC Build 8 FCR-5 PIT/ATO	2	2022	2	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development	Project (Number/Name) 3216 / Tactical Support Center-Integration		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	2	2022	2	2022
	2	2022	2	2022
	2	2022	2	2022
	2	2022	3	2023
	3	2023	4	2023
	4	2023	4	2023
	4	2023	4	2023
	4	2023	4	2023
CVN 68 Class Boundary Defense Capability				
CVN 68 Class Boundary Defense Capability: CVN 68 Class Boundary Defense Capability Design & Development		1	2017	4
				2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development				Project (Number/Name) 4005 / In-Service Carrier Systems Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
4005: <i>In-Service Carrier Systems Development</i>	24.795	0.573	1.660	1.192	-	1.192	1.016	1.048	1.071	1.108	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The In-Service Carrier Systems Demonstration and Validation program exploits available technologies to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs as well as addressing equipment obsolescence issues. Initial technologies include the Ship Control System Governor Software Development, Tank Preservation, Uninterruptible Power Supply (UPS) Replacements, Advanced Damage Control System (ADCS), Weapons Elevator Control Accumulator Replacement, the Integrated Condition Assessment System, the On-Machine I/O development for LPAPs and LPAP air end redesign, Modular Refrigeration Unit (MRU). Demonstration technologies include Advanced Damage Control System (ADCS) software improvements, Input/Output Controller (IOC) Replacement, Fleet Wireless Personal digital Assistant (PDA), Weapons Elevator Laser Positioning System, Legacy Steering Interface upgrades, CVN Integrated Topside Design (ITD) location option evaluation tools, Antenna to Antenna coupling analysis tools, and Passive countermeasures System (PCMS) alternate measurement capability. Wireless systems, smart sensors, lighting systems, knowledge-based systems, automated casualty control, automated technology for workload reduction, linked smart devices, common software tools for interoperability, and self-healing network are technologies being considered for future applications including the following: Integrated Bridge control Data Logger, C4I Network Performance Modeling and Analysis, Network Data Logger Device, Portable Communication System (PCS) proof of concept, Ship Control System (SCS) Onboard trainer, CVN 78 class platform support for Joint Strike Fighter Integration, Development of a Standardized tool to be used to perform structural analyses to assess the adequacy of corroded and degraded structure.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: In-Service Carrier Systems Development	0.573	1.660	1.192	0.000	1.192
Articles:	-	-	-	-	-
FY 2018 Plans: Fiscal Year 2018 plans include continued support to Aircraft Carrier technologies. Modifications, upgrades and development of systems and software will be ongoing in support of In-Service aircraft carrier modernization initiatives and TOC reduction initiatives as well as addressing equipment obsolescence issues.					
FY 2019 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development	Project (Number/Name) 4005 / In-Service Carrier Systems Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Fiscal Year 2019 plans include continued support to Aircraft Carrier technologies. Modifications, upgrades and development of systems and software will be ongoing in support of In-Service aircraft carrier modernization initiatives and TOC reduction initiatives as well as addressing equipment obsolescence issues.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Program decrease due to completion of large LPAP projects (LPAP On-Machine I/O and LPAP Air End Redesign) in FY18.						
Accomplishments/Planned Programs Subtotals		0.573	1.660	1.192	0.000	1.192
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
Investigate, demonstrate, and implement available technologies to deliver a robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment to reduce workload, manpower requirements, and Total Ownership Costs (TOC).						
E. Performance Metrics						
Successfully complete Ship Control System Governor Software Development, AC Plant Model Capacity Optimization, Uninterruptible Power Supply (UPS) Replacements, Advanced Damage Control System (ADCS) Software Improvements, Automatic Fire Sensing and Suppression System/Flooding and Casualty Control Software (AFSSS/FCCS) Software Development Test, Input/Output Controller (IOC) replacement demonstration, Tank Preservation models, Weapons Elevator Laser Positioning demonstration, Legacy Steering Interface Upgrades, CVN Integrated Topside Design (ITD) location option evaluation tool development, Antenna to Antenna coupling analysis tool development, Universal Portable Command and Control Unit (PCCU) development, Ship Control System (SCS) Trainer, Integrated Bridge Control Data Logger, Weapons Elevator Control Accumulator Replacement, and C4I Network Performance Requirements Modeling and Analysis.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development				Project (Number/Name) 4005 / In-Service Carrier Systems Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Ship Integration	WR	NAVSEA : Phil	2.648	0.215	Nov 2016	0.733	Nov 2017	0.537	Nov 2018	-		0.537	0.000	4.133	-
Ship Integration	WR	NAVSEA : Dahlgren	0.197	0.000		0.000		0.000		-		0.000	0.000	0.197	-
Ship Integration	WR	NAVSEA : Carderock	0.225	0.000		0.100	Nov 2017	0.100	Nov 2018	-		0.100	0.000	0.425	-
Subtotal			3.070	0.215		0.833		0.637		-		0.637	0.000	4.755	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NAVSEA : Phil	8.282	0.050	Nov 2016	0.054	Nov 2017	0.050	Nov 2018	-		0.050	0.000	8.436	-
Program Management Support	WR	NAVSEA : Phil	3.227	0.050	Nov 2016	0.150	Nov 2017	0.100	Nov 2018	-		0.100	0.000	3.527	-
Training Development	WR	NAVSEA : Phil	1.365	0.000	Nov 2016	0.050	Nov 2017	0.050	Nov 2018	-		0.050	0.000	1.465	-
Integrated Logistics Support	WR	NAVSEA : Phil	1.604	0.050	Nov 2016	0.100	Nov 2017	0.085	Nov 2018	-		0.085	0.000	1.839	-
Software Development	WR	NAVSEA : Dahlgren	0.308	0.000		0.000		0.000		-		0.000	0.000	0.308	-
Program Management Support	WR	NAVSEA : Dahlgren	0.317	0.000		0.000		0.000		-		0.000	0.000	0.317	-
Program Management Support	WR	NAVSEA : Carderock	0.050	0.050	Nov 2016	0.050	Nov 2017	0.050	Nov 2018	-		0.050	0.000	0.200	-
Subtotal			15.153	0.200		0.404		0.335		-		0.335	0.000	16.092	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	SPAWAR : Atlantic	0.214	0.000		0.000		0.000		-		0.000	0.000	0.214	-
Developmental Test & Evaluation	WR	NAVSEA : Carderock	0.175	0.050	Nov 2016	0.000		0.000		-		0.000	0.000	0.225	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development				Project (Number/Name) 4005 / In-Service Carrier Systems Development								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation	WR	NAVSEA : Phil	5.914	0.108	Nov 2016	0.423	Nov 2017	0.220	Nov 2018	-		0.220	Continuing	Continuing	Continuing	
Developmental Test & Evaluation	WR	NAVSEA : Dahlgren	0.261	0.000		0.000		0.000		-		0.000	0.000	0.261	-	
Subtotal		6.564	0.158		0.423		0.220		-			0.220	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
DAWF	Various	Various : Various	0.008	0.000		0.000		0.000		-		0.000	0.000	0.008	-	
Subtotal		0.008	0.000		0.000		0.000		-			0.000	0.000	0.008	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		24.795	0.573		1.660		1.192		-			1.192	Continuing	Continuing	N/A	

Remarks

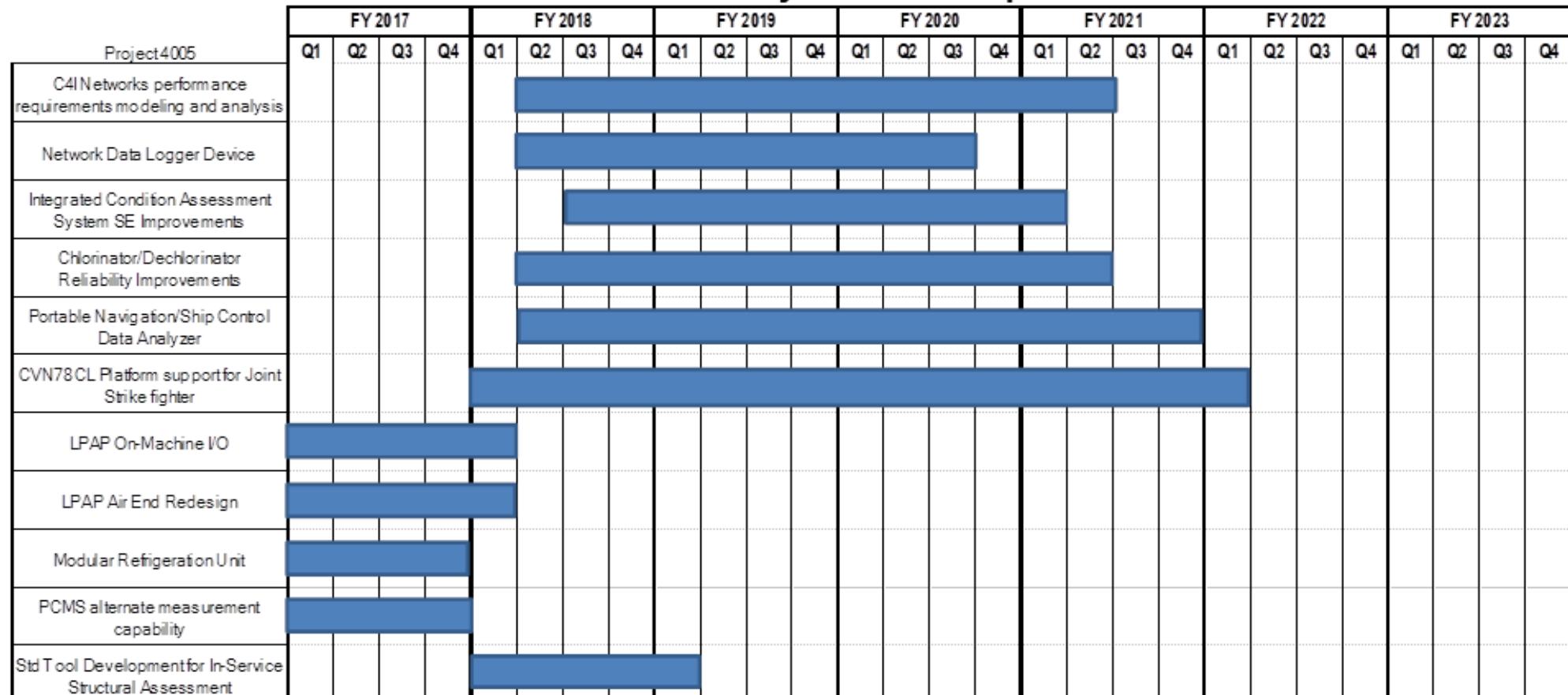
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603512N / Carrier Systems
Development**Project (Number/Name)**4005 / In-Service Carrier Systems
Development**In-Service Carrier Systems Development**

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / Carrier Systems Development	Project (Number/Name) 4005 / In-Service Carrier Systems Development		
Schedule Details				
Events by Sub Project	Start	End	Quarter	Year
Quarter	Year	Quarter	Year	
Proj 4005				
C4I Networks performance requirements modeling and analysis: C4I Networks performance requirements modeling and analysis	2	2018	2	2021
Network Data Logger Device: Network Data Logger Device	2	2018	3	2020
Integrated Condition Assessment System SE Improvements: Integrated Condition Assessment System SE Improvements	3	2018	1	2021
Chlorinator/Dechlorinator Reliability Improvements: Chlorinator/Dechlorinator Reliability Improvements	2	2018	2	2021
Portable Navigation/Ship Control Data Analyzer: Portable Navigation/Ship Control Data Analyzer	2	2018	4	2021
CVN78 CL Platform support for Joint Strike Fighter: CVN78 CL Platform support for Joint Strike fighter	1	2018	1	2022
LPAP On-Machine I/O: LPAP On-Machine I/O	1	2017	1	2018
LPAP Air End Redesign: LPAP Air End Redesign	1	2017	1	2018
Modular Refrigeration Unit: Modular Refrigeration Unit	1	2017	4	2017
PCMS alternate measurement capability: PCMS alternate measurement capability	1	2017	4	2017
Std Tool Development for In-Service Structural Assessment: Std Tool Development for In-Service Structural Assessment and risk definition	2	2018	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603525N I (U)PILOT FISH								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	137.435	132.083	162.222	-	162.222	190.238	186.140	161.780	188.933	Continuing	Continuing	
0428: Pilot Fish	0.000	137.435	132.083	162.222	-	162.222	190.238	186.140	161.780	188.933	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				132.068	132.083	125.290	-	125.290					
Current President's Budget				137.435	132.083	162.222	-	162.222					
Total Adjustments				5.367	0.000	36.932	-	36.932					
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 				-	-	-	-	-					
Adjustments				9.999	0.000	-	-	-					
-4.512				-4.512	0.000	-	-	-					
0.000				0.000	0.000	16.100	-	16.100					
0.000				0.000	0.000	20.832	-	20.832					
-0.120				-0.120	-	-	-	-					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603527N I (U)RETRACT LARCH								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	48.583	37.407	11.745	18.000	29.745	12.070	12.792	12.652	12.163	Continuing	Continuing	
2690: Retract Larch	0.000	48.583	37.407	11.745	18.000	29.745	12.070	12.792	12.652	12.163	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				14.546	15.407	8.135	-	-			8.135		
Current President's Budget				48.583	37.407	11.745	18.000	29.745					
Total Adjustments				34.037	22.000	3.610	18.000	21.610					
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 				-	-	-	-	-					
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 				-1.855	0.000	3.975	-	3.975					
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 				35.907	22.000	-0.365	18.000	17.635					
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 				-0.015	-	-	-	-					
Change Summary Explanation													
Technical: Not applicable.													
Schedule: Not applicable.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603536N / (U)RETRACT JUNIPER										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	0.000	107.871	122.413	114.265	-	114.265	99.781	102.023	100.758	106.544	Continuing	Continuing			
4016: Retract Sycamore	0.000	107.871	122.413	114.265	-	114.265	99.781	102.023	100.758	106.544	Continuing	Continuing			
A. Mission Description and Budget Item Justification															
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.															
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget					115.435	122.413	118.730	-	118.730						
Current President's Budget					107.871	122.413	114.265	-	114.265						
Total Adjustments					-7.564	0.000	-4.465	-	-4.465						
• Congressional General Reductions					-	-									
• Congressional Directed Reductions					-	-									
• Congressional Rescissions					-	-									
• Congressional Adds					-	-									
• Congressional Directed Transfers					-	-									
• Reprogrammings					-4.550	0.000									
• SBIR/STTR Transfer					-2.939	0.000									
• Program Adjustments					0.000	0.000	-0.915	-	-0.915						
• Rate/Misc Adjustments					0.000	0.000	-3.550	-	-3.550						
• Congressional General Reductions					-0.075	-	-	-	-						
• Adjustments															
Change Summary Explanation															
Technical: Not applicable.															
Schedule: Not applicable.															

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603542N / Radiological Control								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	4.441	0.677	0.745	0.740	-	0.740	0.746	0.760	0.776	0.794	Continuing	Continuing	
1830: RADIAC Development	4.441	0.677	0.745	0.740	-	0.740	0.746	0.760	0.776	0.794	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
Mission Description: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure ionizing radiation. These instruments are used on all Navy, Coast Guard and Military Sealift Command vessels, and at every Navy shore installation, in order to ensure the safety of personnel, continuity of operations in radiological contingencies, and protection of the environment.													
Justification: Title 10 of the Code of Federal Regulations, Part 20 (10 CFR 20) requires RADIAC instruments be used to ensure the safety of personnel who work with or are exposed to radioactive materials in their jobs. Additionally, the Navy's mission requires personnel and ships to have the ability to operate in radiological environments and the ability to identify and interdict radiological Weapons of Mass Destruction (WMD). Navy programs that require RADIAC instruments for Occupational Safety & Health (OSH) reasons under the provisions of 10 CFR 20 include Naval Nuclear Propulsion, Nuclear Weapons, Medical, and Radiological Affairs Support. Non-OSH programs include Radiological Defense, Consequence Management, Training, Technical (RADIAC calibration, shielding evaluation, research, etc.) and Radiological Search (maritime interdiction and radiological search missions to locate or intercept WMD).													
This budget item develops, tests and evaluates new, highly reliable, more easily calibrated, easy to care and maintain, light weight and modern RADIAC instruments in order to improve the effectiveness of radiation safety, to make instruments simpler to use, and to reduce life cycle costs. The ultimate goal is to replace old, bulky, costly to maintain and repair, unreliable and obsolete instrumentation with multifunction equipment that can be automatically calibrated at greatly reduced cost.													
This budget item also provides for improvement to nuclear weapons intrinsic radiation (gamma and neutron) shielding calculations, mixed field (neutron and gamma) dosimetry, and in neutron measurement. The objective is to develop less costly and more effective integral shielding for better personnel protection and safety. Improvement in personnel dosimetry and neutron measurement is also a major emphasis.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603542N / Radiological Control				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.702	0.745	0.762	-	0.762
Current President's Budget	0.677	0.745	0.740	-	0.740
Total Adjustments	-0.025	0.000	-0.022	-	-0.022
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.025	0.000			
• Program Adjustments	0.000	0.000	-0.002	-	-0.002
• Rate/Misc Adjustments	0.000	0.000	-0.020	-	-0.020
Change Summary Explanation					
The FY 2019 funding request was reduced by \$0.002 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603542N / Radiological Control				Project (Number/Name) 1830 / RADIAC Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1830: RADIAC Development	4.441	0.677	0.745	0.740	-	0.740	0.746	0.760	0.776	0.794	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission: The Radiation Detection, Indication and Computation (RADIAC) Program is responsible for providing radiation monitoring instruments that detect and measure radiation in accordance with the provisions of Title 10 of the Code of Federal Regulations (10 CFR). These instruments are used on all vessels afloat and at every shore installation in order to ensure the safety of personnel and the environment. RADIACs are also required after an act of terrorism or war that involves nuclear material in order to enable continuing warfighting ability.

Justification: Many RADIAC instruments and dosimetry systems are decades old and approaching the end of their useful lives. In some cases the equipment and replacement parts are no longer manufactured, making the equipment logically unsupportable. In other cases increasing failure rates due to age make replacements an economic efficiency improvement. In all cases a technology refresh will make both economic sense in terms of lowering the total ownership costs, and will also provide increased operational capabilities.

Naval Nuclear Propulsion Program (NNPP): Instruments are developed to support the safe operation and maintenance of nuclear powered vessels and at nuclear maintenance facilities.

Non-NNPP: Instruments are developed to support other than NNPP end users, such as Explosive Ordnance Disposal, Nuclear Weapons, Medical, Industrial Radiography, Radiological Defense and Training.

Visit, Board, Search & Seizure (VBSS): The Navy has been tasked to intercept and board vessels at sea to search for nuclear or radiological materials that could be used for terrorist attacks. These instruments would have different characteristics than those used for NNPP and non-NNPP purposes and prototypes must be developed and/or tested and evaluated.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Radiological Shipboard Defense Monitor	0.080	0.000	0.000	0.000	0.000

Description: All surface combatants require an instrument to detect and measure radiological activity in the event of a nuclear detonation in order for the ship to avoid the radiological danger and continue its mission. The AN/PDR-65, at over 40 years of age, was the instrument used for this purpose, but it is obsolete and has been de-fielded. An interim replacement has been fielded while OPNAV finalizes updating the Cold War requirements

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603542N / Radiological Control		Project (Number/Name) 1830 / RADIAC Development	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
under which the AN/PDR-65 was designed in order to include radiological (terrorist "dirty bomb") threats. The interim replacement is the IM-265 Survey Meter, which is already in the Navy inventory, but was not designed for this requirement and cannot measure radiation external to the ship and is therefore not suitable as the permanent replacement.					
FY 2018 Plans: N/A					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans: N/A					
Title: Primary Dosimetry Articles: <p>Description: The need for primary dosimetry is inherent due to the Navy's operation of nuclear reactors and their emission of ionizing radiation. Title 10 of the Code of Federal Regulations, Part 20.1502, states "Each licensee shall monitor exposures to radiation and radioactive material at levels sufficient to demonstrate compliance with the occupational dose limits." A primary dosimeter must pass accreditation proficiency testing, allowing the reading obtained to become a part of an individual's permanent health record. This permanent record is used to protect the individual radiation worker's health, and also the Navy from future liability. The Navy's current primary device is the DT-702/PD, a Thermo Luminescence Dosimeter (TLD). Existing TLD and newer technologies, such as Optically Stimulated Luminescence (OSL), must be continually researched to determine on-going performance parameters, cost to field and cost to maintain.</p> <p>FY 2018 Plans: NSWCCD and NDC will complete reporting on the pilot study with BeO dosimetry. Additionally, NSWCCD will perform environmental testing, guided by the ANSI N13.11 requirements for normal environmental conditions, on both OSL systems. When all tests are complete, NSWCCD and NDC will submit a comprehensive Technical Report on both OSL systems to SEA 04ND. NSWCCD will also remain up to date on advances of the BeO system and submit a contract package for the FY18 procurement of BeO neutron dosimeters. Finally, NSWCCD will utilize the Freiberg Lexsyg research imaging TL-OSL-RF system to characterize existing and future primary</p>	0.280 1	0.172 1	0.179 -	0.000 -	0.179 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603542N / Radiological Control		Project (Number/Name) 1830 / RADIAC Development	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
dosimeters' luminescent properties to ensure quality and check material weakness prior to adopting these systems into the US Navy. Findings will be summarized in a Technical Memorandum to SEA 04ND.					
<p>FY 2019 Base Plans: NSWCCD will submit a test plan to Naval Sea Systems Command (NAVSEA 04ND) and perform American National Standards Institute (ANSI) N13.11 standard proficiency testing, including neutron radiation tests, on the neutron-capable Beryllium Oxide (BeO) Optically-Stimulated Luminescence (OSL) dosimeters acquired in FY18. NSWCCD will submit the results from the radiological testing to NAVSEA 04ND in a Technical Memorandum. NSWCCD will also continue market research for test and evaluation of new or improved technology applicable to primary dosimetry.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: No significant change.</p>					
<p>Title: Secondary Dosimetry</p> <p>Articles:</p> <p>Description: A secondary dosimeter provides an accurate, real-time readout of the radiation exposure being obtained in operational environments, and is utilized in conjunction with a primary dosimeter. The primary dosimeter does not provide real-time exposure information, so the secondary dosimeter is worn for that purpose. The Navy's secondary dosimeter is the Mk2 Electronic Personal Dosimeter (EPD). Research is required to find a secondary dosimeter that can measure the type of radiation encountered with pulsed X-ray machines, and to see if this new capability can be incorporated into one device.</p> <p>FY 2018 Plans: NSWCCD will continue analyzing Navy user feedback and desired specifications on current pulsed X-ray and electronic dosimetry. Additional market research and testing will be performed as appropriate. NSWCCD will continue analyzing Navy requirements and desired specifications for extremity/lens dosimetry. Testing for the FY17 purchase of extremity dosimetry and criticality dosimetry units will be performed. NSWCCD will submit a Test Plan to SEA 04ND for approval. Additional market research and testing may be performed as appropriate. NSWCCD will submit a Technical Memorandum to SEA 04ND updating commercial capabilities and evaluations with respect to Navy requirements.</p> <p>FY 2019 Base Plans:</p>	0.167	0.125	0.145	0.000	0.145
3	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / Radiological Control	Project (Number/Name) 1830 / RADIAC Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
NSWCCD will continue to remain abreast of the latest advances in electronic dosimetry, both from radiological and logistical perspectives. NSWCCD will assist the SEA 04ND In Service Engineering Agent in the analysis of the logistics necessary to support a new electronic dosimetry system, considering that the Navy's current instrument will go out of production in FY22, necessitating the beginning of a search for a replacement with the possibility it will include enhanced capabilities. NSWCCD will complete investigation into the logistics infrastructure capabilities of new systems and provide an assessment in a Technical Memorandum to Naval Sea Systems Command (NAVSEA 04ND) detailing the areas of improvement possible for the Navy's system.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Inflation and additional test and evaluation man hours.						
Title: Radiological Detection System Description: The Radiological Detection System (RDS) is a survey meter and its associated probes (alpha, beta, gamma, and neutron) used in a wide variety of applications, and the necessary ancillary equipment such as cases, cables and technical manuals. This type of survey meter system is the single most prevalent RADIAC instrument in the Navy inventory, utilized for every Navy end use but predominantly in the Naval Nuclear Propulsion Program (NNPP) and Radiological Defense (RD) end uses. The Joint Program Executive Office for Chemical, Biological and Nuclear Defense (JPEO-CBND) is currently developing the RDS for use by all the Services. When all the Services agree on a single system, it will lower the procurement cost for all and just as significantly, for the first time enable Joint interoperability in the warfighter's Radiological Defense arena. The Navy's current version of this instrument is the IM-260/PD, which is 30 years old and nearing the end of its useful life. Army and Marine Corps use the AN/PDR-75 system and the Air Force the ADM-300, which are both also decades old and obsolescent. The NNPP end use is unique amongst the Services, and while the RDS solution should prove to be sufficient for all the Services for most of their respective applications, Navy must test and evaluate the proposed RDS to ensure the performance and specifications of a Joint solution will be sufficient to meet the requirements of the NNPP application. FY 2018 Plans:	Articles: 0.110 - 0.150 - 0.161 3 0.000 - 0.161 3					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / Radiological Control	Project (Number/Name) 1830 / RADIAC Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
NSWCCD will continue coordinating with JPEO-CBND in RDS related activities.						
FY 2019 Base Plans: NSWCCD will purchase three low rate initial production units through JPEO-CBND. The units will undergo radiological testing at NSWCCD to ensure they meet Navy specifications for all applications. Product demonstrations will be provided to Naval Sea Systems Command (NAVSEA 04ND), Office of the Chief of Naval Operations (OPNAV) N45 and N96, and major end users. A summary of test results and end user feedback will be provided in a Technical Memorandum to NAVSEA 04ND and JPEO-CBND to assist in the procurement stage of the RDS project.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Procurement of three test articles.						
Title: Visit, Board, Search & Seizure	Articles:	0.040	0.043	0.076	0.000	0.076
Description: The Visit, Board, Search & Seizure (VBSS) mission of the Navy includes the requirement to be able to board ships and be able to detect and identify potential radiological or nuclear Weapons of Mass Destruction (WMD). Such a sensitive mission requires leading edge technology and capabilities to ensure success. The AN/PDX-1 RADIAC Set was fielded in response to a Joint Urgent Operational Needs Statement to meet this requirement. It contains three instruments that serve different purposes: (1) a Handheld Radiation Monitor (HRM) that searches for radiological materials; (2) a Radioisotope Identifier (RID) that identifies the type of radiological material located; and (3) a Personal Radiation Detector (PRD) that displays the radiological dose the VBSS team members may be receiving so that they can be aware if they are being exposed to dangerous levels of radioactivity during the mission. Current technology dictates that the sensitivity of the detectors is directly proportional to the size of the detector element; i.e., the larger the detector, the more sensitive and capable it is. However, in VBSS there must be a tradeoff between size/weight and capability, since it is difficult and hazardous for boarding parties to carry a backpack-sized detector, along with their weapons and other gear, up a rope ladder to board a vessel on the high seas. This will be a continuing effort to find smaller, lighter instruments with enhanced sensitivity, reach-back capability, and other enhancements to provide the Navy the best and most cost effective equipment possible for this critical mission.		-	6	3	-	3
FY 2018 Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / Radiological Control	Project (Number/Name) 1830 / RADIAC Development					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
NSWCCD will purchase new PRDs and HRMs for test and evaluation. The Test Plan developed in FY17 will be finalized and submitted to SEA 04ND, so that evaluation of new units can begin upon delivery. NSWCCD will complete test and evaluation of the commercial units, summarize the results and submit the findings in a Technical Report to SEA 04ND. Simultaneously, NSWCCD will internally review all VBSS RID Technical Report data to date, so as to analyze development of the technology over time. Recurring issues and other trends will be noted in order to create a more detailed plan for the next round of test and evaluation. Additional test data from other sources, such as the Defense Threat Reduction Agency (DTRA), will be researched to aid in developing the next Test Plan. NSWCCD will also perform market research into new commercial RID products and capabilities by surveying industry and other technical contacts. NSWCCD will then develop a specification for the next purchase of RIDs and prepare a procurement package for FY19 solicitation.							
FY 2019 Base Plans: NSWCCD will solicit and award contracts to buy three new commercial Radioisotope Identifiers (RIDs). The test plan developed in FY18 will be finalized and submitted to Naval Sea Systems Command (NAVSEA 04ND) for approval in order that evaluation of the new RIDs can begin upon delivery. NSWCCD will complete test and evaluation of the RIDs, summarize the results and submit the findings in a Technical Report to NAVSEA 04ND.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Procurement of three test articles.							
Title: Telescoping Rate Meter	Articles:	0.000	0.255	0.179	0.000	0.179	
Description: Telescoping rate meters play a vital role in the practice of radiation safety in the Naval Nuclear Propulsion Program. The detector is attached to the end of an extendable, telescoping pole, thus allowing the operator to maintain a safe distance from high exposure areas. This allows the Navy to comply with federal regulations, which mandate that radioactive doses received by operators be As Low As Reasonably Achievable (ALARA). The current instrument is 30 years old and approaching obsolescence due to the unavailability of repair parts.		-	5	-	-	-	
FY 2018 Plans: NSWCCD will perform market research into commercial versions of this instrument as used in commercial nuclear power applications. Published specifications will be compared against the performance of the Navy's							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018					
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603542N / Radiological Control					Project (Number/Name) 1830 / RADIAC Development							
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)															
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total											
current IM-260. End-user feedback regarding desired performance will be collected. NSWCCD will prepare and submit a contract package for the procurement of several telescoping rate meter units for evaluation.															
FY 2019 Base Plans: NSWCCD will submit a test plan to Naval Sea Systems Command (NAVSEA 04ND) and upon its approval complete testing on the telescoping rate meter units that were procured in FY18. The test results and their applicability to US Navy requirements will be summarized in a Technical Memorandum to NAVSEA 04ND.															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: Test articles procured in FY18 but not in FY19.															
Accomplishments/Planned Programs Subtotals							0.677	0.745	0.740	0.000	0.740				
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• OPN 2920: RADIAC	8.092	10.718	8.175	-	8.175	8.269	8.344	8.524	8.693	Continuing	Continuing				
Remarks															
D. Acquisition Strategy Development efforts are focused on evaluation, modification (as required to meet operational requirements) and adaptation of commercial-off-the-shelf (COTS) technology in order to minimize total ownership costs. To the maximum extent possible new contracts are targeted for fixed price efforts to control development cost.															
E. Performance Metrics Program Reviews															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603542N / Radiological Control				Project (Number/Name) 1830 / RADIAC Development							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	WR	NSWCCD : West Bethesda, MD	4.201	0.350	Nov 2016	0.639	Nov 2017	0.614	Nov 2018	-		0.614	Continuing	Continuing	Continuing
Primary Dosimetry	C/FFP	NSWCCD : West Bethesda, MD	0.100	0.185	Aug 2017	0.003	May 2018	0.000		-		0.000	0.000	0.288	0.288
Secondary Dosimetry	C/FFP	NSWCCD : West Bethesda, MD	0.020	0.142	Aug 2017	0.000		0.000		-		0.000	0.000	0.162	0.162
VBSS	C/FFP	NSWCCD : West Bethesda, MD	0.120	0.000		0.063	Jun 2018	0.063	Jun 2019	-		0.063	0.000	0.246	0.246
Telescoping Rate Meter	C/FFP	NSWCCD : West Bethesda, MD	0.000	0.000		0.040	Jul 2018	0.000		-		0.000	0.000	0.040	0.040
Radiological Detection System	C/FFP	NSWCCD : West Bethesda, MD	0.000	0.000		0.000		0.063	Sep 2019	-		0.063	0.000	0.063	0.063
Subtotal			4.441	0.677		0.745		0.740		-		0.740	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			4.441	0.677		0.745		0.740		-		0.740	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																						Date: February 2018			
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)									
1319 / 4				PE 0603542N / Radiological Control				1830 / RADIAC Development																	
Radiological Shipboard Defense Monitor	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
System Development	Complete ■																								

2019PB - 0603542N - 1830

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603542N / Radiological Control

Project (Number/Name)

1830 / RADIAC Development

Primary Dosimetry	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q																											
Test & Evaluation																															
	PS			DT			TR			DT																					
Contract Events									P																						

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603542N / Radiological Control

Project (Number/Name)

1830 / RADIAC Development

Secondary Dosimetry	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q																											
Test & Evaluation																															
	TRR				DT																										
Logistics Events																															
					</																										

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603542N / Radiological Control

Project (Number/Name)

1830 / RADIAC Development

Radiological Detection System	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
Systems Engineering																														
	SRR	SFR			CDR																									
Contract Events													P																	

2019PB - 0603542N - 1830

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603542N / Radiological Control

Project (Number/Name)

1830 / RADIAC Development

Visit, Board, Search & Seizure	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
Systems Engineering																															
	SSR	SFR																													
Test & Evaluation																															
Contract Events																															
	P																														

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603542N / Radiological Control

Project (Number/Name)

1830 / RADIAC Development

Teletector	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Systems Engineering					SRR	SFR																							
Test & Evaluation																	DT												
Contract Events						P																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / Radiological Control		Project (Number/Name) 1830 / RADIAC Development	
Schedule Details				
Events by Sub Project	Start	End	Quarter	Year
Quarter	Year	Quarter	Year	
Radiological Shipboard Defense Monitor				
System Development: Complete	1	2017	1	2017
Primary Dosimetry				
Test & Evaluation: Pilot Study of Beryllium Oxide (BeO) Dosimetry	1	2017	4	2017
Test & Evaluation: Environmental Testing of BeO Dosimetry	1	2018	2	2018
Test & Evaluation: Technical Report on Optically Stimulated Luminescence Dosimetry	3	2018	4	2018
Test & Evaluation: Proficiency Testing of Neutron Capable Dosimeters	1	2019	4	2019
Contract Events: Procure Neutron Capable Dosimeters	2	2018	4	2018
Secondary Dosimetry				
Test & Evaluation: Test Readiness Review and Data Compilation	1	2017	4	2017
Test & Evaluation: Pulsed X-ray and Electronic Dosimetry	1	2018	4	2018
Logistics Events: Integrated Logistics Analysis	1	2019	4	2019
Radiological Detection System				
Systems Engineering: System Requirements Review	1	2017	2	2017
Systems Engineering: System Functional Review	3	2017	4	2017
Systems Engineering: Critical Design Review	1	2018	4	2018
Contract Events: Procure LRIP Units	1	2019	3	2019
Visit, Board, Search & Seizure				
Systems Engineering: System Requirements Review	1	2017	2	2017
Systems Engineering: System Functional Review	3	2017	4	2017
Test & Evaluation: Developmental Test & Evaluation	1	2018	4	2019
Contract Events: Procure PRD and HRM Test Units	1	2017	4	2017
Contract Events: Procure RID Test Units	1	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603542N / Radiological Control	Project (Number/Name) 1830 / RADIAC Development		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Teletector				
Systems Engineering: System Requirements Review	1	2018	2	2018
Systems Engineering: System Functional Review	3	2018	4	2018
Test & Evaluation: Developmental Test & Evaluation	1	2019	4	2019
Contract Events: Procure Test Units	2	2018	4	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018																																																																															
Appropriation/Budget Activity					R-1 Program Element (Number/Name)																																																																																					
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603553N / Surface ASW																																																																																					
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost																																																																														
Total Program Element	185.861	1.039	1.136	1.122	-	1.122	1.145	1.170	1.195	1.220	Continuing	Continuing																																																																														
1704: Undersea Warfare	185.861	1.039	1.136	1.122	-	1.122	1.145	1.170	1.195	1.220	Continuing	Continuing																																																																														
A. Mission Description and Budget Item Justification																																																																																										
The FY 2019 funding request was reduced by \$.006 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.																																																																																										
The Rest-of-the-World (ROW) continues to produce quieter, more lethal submarine technologies. Adaptable commercial technologies are readily available to the ROW navies. These trends increase the threats to United States (US) surface combatants, thus requiring a focused effort to identify the most promising Anti-Submarine Warfare (ASW) technologies through a process of discovery, assessment, experimentation, and analysis.																																																																																										
This project will pursue the development of technologies with the goal of improving ASW effectiveness to the point of rendering the enemy submarine irrelevant against US and coalition forces. Studies, experiments and/or technology developments under this project will seek to improve the ability of surface combatants to detect, classify, localize, and track submerged contacts and detect and defend against modern torpedoes. To achieve these objectives, it is essential to develop new ASW technologies and conduct at-sea experiments to prove/disprove technology concepts and collect corroborating data. The product of these efforts will be provided to the Advanced Capability Build (ACB) program supporting the continuing improvement of the AN/SQQ-89 Surface ASW Combat System.																																																																																										
B. Program Change Summary (\$ in Millions)																																																																																										
<table> <thead> <tr> <th></th><th>FY 2017</th><th>FY 2018</th><th>FY 2019 Base</th><th>FY 2019 OCO</th><th>FY 2019 Total</th></tr> </thead> <tbody> <tr> <td>Previous President's Budget</td><td>1.081</td><td>1.136</td><td>1.159</td><td>-</td><td>1.159</td></tr> <tr> <td>Current President's Budget</td><td>1.039</td><td>1.136</td><td>1.122</td><td>-</td><td>1.122</td></tr> <tr> <td>Total Adjustments</td><td>-0.042</td><td>0.000</td><td>-0.037</td><td>-</td><td>-0.037</td></tr> <tr> <td> • Congressional General Reductions</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Directed Reductions</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Rescissions</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Adds</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Directed Transfers</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Reprogrammings</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • SBIR/STTR Transfer</td><td>-0.042</td><td>0.000</td><td></td><td></td><td></td></tr> <tr> <td> • Program Adjustments</td><td>0.000</td><td>0.000</td><td>-0.024</td><td>-</td><td>-0.024</td></tr> <tr> <td> • Rate/Misc Adjustments</td><td>0.000</td><td>0.000</td><td>-0.013</td><td>-</td><td>-0.013</td></tr> </tbody> </table>														FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Previous President's Budget	1.081	1.136	1.159	-	1.159	Current President's Budget	1.039	1.136	1.122	-	1.122	Total Adjustments	-0.042	0.000	-0.037	-	-0.037	• Congressional General Reductions	-	-				• Congressional Directed Reductions	-	-				• Congressional Rescissions	-	-				• Congressional Adds	-	-				• Congressional Directed Transfers	-	-				• Reprogrammings	-	-				• SBIR/STTR Transfer	-0.042	0.000				• Program Adjustments	0.000	0.000	-0.024	-	-0.024	• Rate/Misc Adjustments	0.000	0.000	-0.013	-	-0.013
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total																																																																																					
Previous President's Budget	1.081	1.136	1.159	-	1.159																																																																																					
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• Congressional General Reductions	-	-																																																																																								
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• Congressional Directed Transfers	-	-																																																																																								
• Reprogrammings	-	-																																																																																								
• SBIR/STTR Transfer	-0.042	0.000																																																																																								
• Program Adjustments	0.000	0.000	-0.024	-	-0.024																																																																																					
• Rate/Misc Adjustments	0.000	0.000	-0.013	-	-0.013																																																																																					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603553N / Surface ASW
<p><u>Change Summary Explanation</u></p> <p>Funding: The decrease in FY 2019 will result in less capabilities developed via the BAA process and transmitted to the ACB program and is attributable to inflation and contractor support services specific rate adjustments.</p> <p>Schedule: Broad Agency Announcement (BAAs) awards in FY 2019, FY 2021, and FY 2023 have been shifted from 1Q to 2Q to more accurately reflect funding availability and time required to make a new award.</p>	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603553N / Surface ASW				Project (Number/Name) 1704 / Undersea Warfare			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1704: Undersea Warfare	185.861	1.039	1.136	1.122	-	1.122	1.145	1.170	1.195	1.220	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Rest-of-the-World (ROW) continues to produce quieter, more lethal submarine technologies. Adaptable commercial technologies are readily available to the ROW navies. These trends increase the threats to United States (US) surface combatants, thus requiring a focused effort to identify the most promising Anti-Submarine Warfare (ASW) technologies through a process of discovery, assessment, experimentation, and analysis.

This project will pursue the development of technologies with the goal of improving ASW effectiveness to the point of rendering the enemy submarine irrelevant against US and coalition forces. Studies, experiments and/or technology developments under this project will seek to improve the ability of surface combatants to detect, classify, localize, and track submerged contacts and detect and defend against modern torpedoes. To achieve these objectives, it is essential to develop new ASW technologies and conduct at-sea experiments to prove/disprove technology concepts and collect corroborating data. The product of these efforts will be provided to the Advanced Capability Build (ACB) program supporting the continuing improvement of the AN/SQQ-89 Surface ASW Combat System.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: ASW Concept Development/Studies					1.039	1.136	1.122	0.000	1.122
				Articles:	-	-	-	-	-
FY 2018 Plans:									
Collect systems and performance data during select Fleet exercises and at-sea testing events, including one additional data collection event on relevant modern torpedo acoustic signature characteristics. Analyze and distribute collected data. Conduct studies and AoA in support of improved ASW operations. Continue advanced development efforts initiated in FY17 to prototype promising new ASW concepts applying Doppler Matched Processing techniques to ASW and Torpedo Defense.									
FY 2019 Base Plans:									
Award new development contract via BAA in support of AN/SQQ-89 Fleet requirements. Initiate capability development and submit to the ACB program from Step 1 (algorithm/technology assessment by peer review panel of Subject Matter Experts (SME)) and Step 2 (algorithm/technology testing with open and closed data sets to refine capabilities prior to integration) testing.									
FY 2019 OCO Plans:									
N/A									
FY 2018 to FY 2019 Increase/Decrease Statement:									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018											
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603553N / Surface ASW						Project (Number/Name) 1704 / Undersea Warfare												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
The decrease in FY 2019 due to rate adjustments.																						
Accomplishments/Planned Programs Subtotals												1.039	1.136	1.122	0.000	1.122						
C. Other Program Funding Summary (\$ in Millions)													Cost To									
Line Item	FY 2017	FY 2018	FY 2019	Base	FY 2019	Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost	Cost To	Cost To								
• RDTEN/0205620N/1916: <i>Surface ASW System Improvement</i>	23.779	29.351	28.421	-	28.421	29.766	29.476	30.000	30.629	Continuing	Continuing											
• OPN/2136: <i>AN/SQQ-89 Surf ASW Cmbt Sys</i>	87.824	102.222	115.459	-	115.459	125.586	127.452	132.673	135.329	Continuing	Continuing											
Remarks																						
D. Acquisition Strategy																						
Use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations.																						
E. Performance Metrics																						
Investigate promising ASW technologies via the four step ACB spiral development/improvement process.																						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603553N / Surface ASW				Project (Number/Name) 1704 / Undersea Warfare							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Development	C/CPFF	AAC : NY	1.134	0.000		0.000		0.000		-		0.000	0.000	1.134	-
Technology Development	C/CPFF	Adaptive Methods : VA	3.788	0.000		0.000		0.000		-		0.000	0.000	3.788	-
Technology Development	C/CPFF	Alion Sciences : VA	8.000	0.000		0.000		0.000		-		0.000	0.000	8.000	-
Technology Development	C/CPIAF	EG&G : VA	2.050	0.000		0.000		0.000		-		0.000	0.000	2.050	-
Technology Development	C/CPFF	In-Depth Engineering : VA	3.635	0.000		0.000		0.000		-		0.000	0.000	3.635	-
Technology Development	C/CPFF	JHU/APL : MD	25.333	0.000		0.000		0.000		-		0.000	0.000	25.333	-
Technology Development	C/CPFF	L-3 Communications : VA	3.000	0.000		0.000		0.000		-		0.000	0.000	3.000	-
Technology Development	C/CPFF	Lockheed Martin - ISS : NY	7.110	0.000		0.000		0.000		-		0.000	0.000	7.110	-
Technology Development	WR	NSWC/Carderock : MD	3.201	0.000		0.000		0.000		-		0.000	0.000	3.201	-
Technology Development	WR	NUWC/Keyport : WA	0.790	0.000		0.000		0.000		-		0.000	0.000	0.790	-
Technology Development	WR	NUWC/Newport : RI	33.260	0.000		0.000		0.000		-		0.000	0.000	33.260	-
Technology Development	C/CPFF	Northrop Grumman : VA	4.684	0.000		0.000		0.000		-		0.000	0.000	4.684	-
Technology Development	C/CPFF	UT/ARL : TX	4.908	0.000		0.000		0.000		-		0.000	0.000	4.908	-
Technology Development	C/CPFF	VAR : VAR*	4.694	0.000		0.000		0.000		-		0.000	0.000	4.694	-
Technology Development	WR	NFESC/PH : CA	5.350	0.000		0.000		0.000		-		0.000	0.000	5.350	-
Technology Development	MIPR	SSGC : MS	3.253	0.000		0.000		0.000		-		0.000	0.000	3.253	-
Detection/Classification Algorithms (LRS)	WR	NAWC/Pax River : MD	2.400	0.000		0.000		0.000		-		0.000	0.000	2.400	-
Detection/Classification Algorithms (LRS)	C/CPFF	VAR : VAR*	8.600	0.000		0.000		0.000		-		0.000	0.000	8.600	-
Technology Development (LRS)	WR	NRL : DC	2.500	0.000		0.000		0.000		-		0.000	0.000	2.500	-
Technology Development (LRS)	C/CPFF	VAR : VAR*	14.950	0.000		0.000		0.000		-		0.000	0.000	14.950	-
Subtotal			142.640	0.000		0.000		0.000		-		0.000	0.000	142.640	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603553N / Surface ASW				Project (Number/Name) 1704 / Undersea Warfare							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks															
*Consists of multiple performing activities with funding for each not greater than \$1M per year.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
At-Sea Test/Experiment	WR	ONR : VA	5.500	0.000		0.000		0.000		-		0.000	0.000	5.500	-
Developmental Test & Evaluation	C/CPFF	AAC : NY	1.067	0.000		0.000		0.000		-		0.000	0.000	1.067	-
Developmental Test & Evaluation	C/CPFF	ALION : IL	0.749	0.000		0.000		0.000		-		0.000	0.000	0.749	-
Developmental Test & Evaluation	C/CPFF	Applied Physical Sciences : CT	0.000	0.749	Feb 2017	0.750	Jan 2018	0.731	Dec 2018	-		0.731	Continuing	Continuing	Continuing
Developmental Test & Evaluation	C/CPFF	JHU/APL : MD	2.735	0.000		0.000		0.000		-		0.000	0.000	2.735	-
Developmental Test & Evaluation	WR	NRL : DC	0.537	0.000		0.000		0.000		-		0.000	0.000	0.537	-
Developmental Test & Evaluation	WR	NSMA : VA	0.907	0.000		0.000		0.000		-		0.000	0.000	0.907	-
Developmental Test & Evaluation	WR	NSWC/Carderock : MD	1.172	0.000		0.000		0.000		-		0.000	0.000	1.172	-
Developmental Test & Evaluation	WR	NUWC/Newport : RI	11.453	0.000		0.000		0.000		-		0.000	0.000	11.453	-
Developmental Test & Evaluation	WR	SPAWAR : CA	0.277	0.000		0.000		0.000		-		0.000	0.000	0.277	-
Developmental Test & Evaluation	C/CPFF	UT/ARL : TX	1.844	0.000		0.000		0.000		-		0.000	0.000	1.844	-
Developmental Test & Evaluation	C/CPFF	VAR : VAR*	5.224	0.170	Jan 2017	0.266	Feb 2018	0.289	Dec 2018	-		0.289	Continuing	Continuing	Continuing
Enhanced Data Collection	C/CPFF	JHU/APL : MD	4.462	0.000		0.000		0.000		-		0.000	0.000	4.462	-
Enhanced Data Collection	C/CPFF	UT/ARL : TX	2.000	0.000		0.000		0.000		-		0.000	0.000	2.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018					
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603553N / Surface ASW					Project (Number/Name) 1704 / Undersea Warfare							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total					
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract		
		Subtotal	37.927	0.919		1.016		1.020		-		1.020	Continuing	Continuing	N/A		
Remarks																	
*Consists of multiple performing activities with funding for each not greater than \$1M per year.																	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total					
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract		
Program Management Support	C/CPAF	BAE Systems : MD	4.824	0.000		0.000		0.000		-		0.000	0.000	4.824	-		
Program Management Support	C/CPIF	CGI Federal : VA	0.120	0.120	Nov 2016	0.120	Feb 2018	0.102	Dec 2018	-		0.102	Continuing	Continuing	Continuing		
Travel	Allot	NAVSEA PEO IWS 5 : DC	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	-		
Travel (LRS)	Allot	ONR : DC	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	-		
		Subtotal	5.294	0.120		0.120		0.102		-		0.102	Continuing	Continuing	N/A		
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
				Project Cost Totals	185.861	1.039		1.136		1.122		-		1.122	Continuing	Continuing	N/A
Remarks																	

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603553N / Surface ASW

Project (Number/Name)

1704 / Undersea Warfare

Proj 1704.L24	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
ASW Concept Development/Studies																														
BAA Award / Technology Development	BAA Award - 2017 ▲								BAA Award - 2019 ▲								BAA Award - 2021 ▲									BAA Award - 2023 ▲				
Data Collection/Analysis																														

2019PB - 0603553N - 1704.L24

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603553N / Surface ASW	Project (Number/Name) 1704 / Undersea Warfare		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 1704.L24</i>				
ASW Concept Development/Studies: BAA Award / Technology Development: BAA Award - 2017		2	2017	2
ASW Concept Development/Studies: BAA Award / Technology Development: BAA Award - 2019		2	2019	2
ASW Concept Development/Studies: BAA Award / Technology Development: BAA Award - 2021		2	2021	2
ASW Concept Development/Studies: BAA Award / Technology Development: BAA Award - 2023		2	2023	2
ASW Concept Development/Studies: BAA Award / Technology Development: Data Collection/Analysis		1	2017	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)											PE 0603561N / Advanced Submarine System Development		
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	933.435	120.289	100.955	109.086	-	109.086	113.460	107.884	105.832	111.793	Continuing	Continuing	
0223: Sub Combat System Improvement (ADV)	485.968	40.626	40.828	47.118	-	47.118	49.531	51.708	51.954	53.053	Continuing	Continuing	
2033: Adv Submarine Systems Development	447.467	51.684	35.795	30.685	-	30.685	32.589	34.917	34.923	35.774	Continuing	Continuing	
2096: Payload Delivery Development	0.000	3.800	15.738	22.956	-	22.956	22.887	12.659	10.188	14.012	Continuing	Continuing	
3391: SSN/SSGN Survivability Program	0.000	0.000	8.594	8.327	-	8.327	8.453	8.600	8.767	8.954	Continuing	Continuing	
9999: Congressional Adds	0.000	24.179	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	24.179	

A. Mission Description and Budget Item Justification

This program element supports innovative research and development in submarine Hull, Mechanical and Electrical (HM&E) and combat systems technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible. The program element also supports programs transitioning from Science and Technology (S&T), Defense Advanced Research Projects Agency (DARPA), Independent Research and Development, and Small Business Innovation Research (SBIR) projects.

Project 0223: The Submarine Combat System Improvement (Advanced) (Non-ACAT) Project researches, develops, and tests new sonar, combat system, imaging, and electronic warfare software and develops, tests, and prototypes new sonar arrays for Program Executive Office Submarine (PEO SUB) programs, delivering about thirty (30) new capabilities every other year. This Project supports Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of sensors and sensor processing systems supporting tactical control systems improvements. Improvements are supportive of A Cooperative Strategy for 21st Century Sea Power and the Chief of Naval Operations (CNO) Design for Maintaining Maritime Superiority; addressing all components to include Strengthen Naval Power At and From Sea, Achieve High Velocity Learning, Strengthen Our Navy Team for the Future, and Expand and Strengthen Our Network of Partners. This Project addresses threats posed by China, Russia, Iran, Korea and Terrorism (CRIKT), improved lethality of U.S. Submarine Forces and 3rd Offset Capabilities in the Unmanned and Automated Systems domains.

Project 0223 is comprised of three major efforts: Advanced Processing Builds (APB), Flank Array Demonstration, and Advanced Sensors.

APB develops, tests and transitions capabilities for:

- APB Acoustics, transitioning to AN/BQQ-10
- APB Tactical Control, transitioning to AN/BYG-1
- APB Imaging, transitioning to AN/BVY-1

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> - APB Electronic Warfare (EW), transitioning to AN/BLQ-10	R-1 Program Element (Number/Name) PE 0603561N / <i>Advanced Submarine System Development</i>	
Flank Array Demonstration develops signal processing, integrates improvements and conducts testing and analysis for large array configurations. Improvements are transitioned to PEO SUB for fielding on the Virginia Class submarines.		
Advanced Sensors develops new technologies for Hull Mounted and Towed Arrays. Hull Mounted improvements support submarine applications only. Towed array improvements are shared to support surface and surveillance applications, as well.		
<p>Project 2033:</p> <p>The Advanced Submarine Systems Development (ASSD) Program is a non-acquisition program that develops and matures technologies for successful integration into future and modernized submarine classes, thus lowering acquisition and life cycle program costs while improving mission capability. ASSD transitions Hull, Mechanical, and Electrical (HM&E) technologies and future naval concepts from Science & Technology (S&T) and Research and Development (R&D) to operational platforms; performs tests and demonstrates submarine design and naval architecture products destined for integration into future submarine classes or backfit into existing fleet assets; develops, initially integrates, and does test validation of leading payload concepts for submarine integration in support of the Design for Undersea Warfare; and operates unique R&D experimentation, modeling, testing and simulation facilities to enhance submarine stealth, maneuverability, capability, and affordability. The program also supports Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), Office of Naval Research (ONR), Defense Advanced Research Projects Agency (DARPA) programs, and near and mid-term technology insertion to achieve future submarine class total ownership cost reductions, and influence future submarine concept designs and core technologies. Experimentation and demonstration is conducted in a joint warfighting context with other services, (i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force), to enable early assessment of warfighting capabilities, and to contribute to smarter technology selection decisions for potential incremental development. This program also supports Information Exchange Programs and joint Project Agreements (PA) with the United Kingdom, Canada, Australia and other international partners.</p>		
Project 2033 is comprised of three budget categories: Strategic Capability Infrastructure, Long Range R&D Investment, Rapid Prototyping.		
The major developmental efforts include:		
<p>Strategic Capability Infrastructure</p> <ul style="list-style-type: none">- Large Scale Vehicle (LSV)- Intermediate Scale Measurement System (ISMS) <p>Long Range R&D Investment</p> <ul style="list-style-type: none">- Advanced Submarine Control (Secondary Propulsion System)- Advanced Material Propeller (AMP) Technology- Innovation Technology Transition (SBIRs/STTRs)- Next Generation Attack Submarine (SSN(X)) Technologies- Next Generation (NG) Thrust		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		PE 0603561N / <i>Advanced Submarine System Development</i>
- Submarine Signature Management/Acoustic Superiority - Advanced Hull Coatings - Next Generation Towed Array Reliability - Support of ONR Future Naval Capability (FNC) new starts - Hydraulic Elimination through Electrification		
Rapid Prototyping - Common Unmanned Aerial Vehicle (UAS) Comms - Fleet Module Autonomous Underwater Vehicle (FMUAV) - Li-Ion Battery FMAUV Submarine Integration - Clandestine Delivered Mine (CDM) - Advanced Weapons Enhanced by Submarine UAS against Mobile targets (AWESUM)/Blackwing Unmanned Aerial System (UAS) - Submarine Payload Integration - Electronic Warfare/Intelligence Surveillance and Reconnaissance (EW/ISR) Unmanned Underwater Vehicle (UUV) Payload - Submarine Launch Decoy		
Project 2096: Payload Delivery Development, consists of two (2) sub-projects: - Payload Handling System (PHS) - 3" Sub Launched Unmanned "K" Aerial System (SL-UKAS)		
Payload Delivery Development is a non-acquisition program that supports innovative research and development efforts to enable integration of deployable and/or retrievable undersea vehicles, payload concepts, and offboard systems through design, manufacture, test/demonstration, evaluation, and validation for submarine platforms. In addition to technology development, the program will support engineering and integration of new and existing technologies to enable rapid prototyping and fielding of capabilities which will inform and provide solutions to urgent war-fighter needs. Experimentation will be conducted with the Fleet (i.e., Commander, Naval Submarine Forces (COMSUBFOR), Unmanned Undersea Vehicle Squadron One (UUVRON ONE), etc.), enabling an agile environment through at-sea demonstrations, which will provide Fleet and acquisition stakeholders with relevant payload employment data to inform Concepts of Operations (CONOPs) and fielding decisions. The program will furthermore support transition of high-interest systems and/or payloads from research and development to Programs of Record (PoRs), as appropriate.		
Project 3391: SSN/SSGN Survivability Program (S3P) efforts previously funded under project 2033(through FY17) will move to Project 3391 in FY18. S3P addresses gaps in stealth and the survivability for current and future SSN/SSGN force.		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603561N / Advanced Submarine System Development			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	106.365	100.955	114.588	-	114.588
Current President's Budget	120.289	100.955	109.086	-	109.086
Total Adjustments	13.924	0.000	-5.502	-	-5.502
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.378	0.000			
• Program Adjustments	0.000	0.000	-3.782	-	-3.782
• Rate/Misc Adjustments	0.001	0.000	-1.720	-	-1.720
• Congressional General Reductions	-0.157	-	-	-	-
Adjustments					
• Congressional Directed Reductions	-7.542	-	-	-	-
Adjustments					
• Congressional Add Adjustments	25.000	-	-	-	-
Congressional Add Details (\$ in Millions, and Includes General Reductions)					
Project: 9999: Congressional Adds					
Congressional Add: Advanced Materials Propeller Research					
			Congressional Add Subtotals for Project: 9999		
			Congressional Add Totals for all Projects		
				FY 2017	FY 2018
				24.179	0.000
				24.179	0.000
				24.179	0.000

Change Summary Explanation

Funding:

FY 2017: Net PE increase of \$13.924M including: \$+25.0M for the Advanced Materials Propeller Research Congressional Add; -\$7.699M for directed Congressional Adjustments; and -\$3.378M for Small Business Innovative Research (SBIR) assessment.

The FY 2019 funding request was reduced by \$4.1 million to account for the availability of prior year execution balances.

Project 0223:

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)			
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0603561N / <i>Advanced Submarine System Development</i>			
<p>- The net FY 2018 to FY 2019 budget increase of \$+6.290M was driven by the requirement to significantly expand APB advanced development efforts. Advancing capabilities of adversary navies require the application of emerging state-of-the-art computing technologies and development of capabilities in non-traditional tactical areas to compliment the core APB domain. The APB development budget, which began with a limited portfolio developing Towed Array Signal Processing improvements, has since expanded over time, and is required to address Hull Arrays, Tactical Control, Tactical Decision Aids, Active Intercept & Receive, Imaging, Operator Interface Modernization, Command Tool Development, and more recently EW. The APB budget increase in FY 2019 is needed to properly resource its breadth of requirements. The increase in APB is provided to establish a needed land-based EW capability development laboratory system; conduct new EW algorithm development; pursue the use of Big Data Analytics; Machine Learning and Artificial Intelligence (AI) computing techniques; develop new automation tools and processing for Unmanned Vehicles; and develop automated tools related to CRIKT. APB development added EW to its portfolio in FY 2017 and initial efforts included establishing a systems engineering approach, hiring national-level Subject Matter Experts (SMEs), and collecting data that will be used to initiate new capability development. Efforts in FY 2019 will build on this foundation with further data collections, system refinements, new capability development, and transition to operational use. The ability of our Submarines to operate covertly in forward areas is challenged by the emergence and wide spread use of modern commercial and military radars that exploit software-defined radio technology and can alter their operating characteristics on-the-fly with the use of a thumb drive. These radars and their waveforms are evolving quickly and are expected to continue to present a rapidly moving target for U.S. EW capabilities to keep pace with. A robust APB EW program is needed to enable our Submarines to continue to operate safely and effectively into the future. The use of modern computing technologies and new automation techniques are required to outpace emerging threat platforms that are rapidly becoming more difficult to detect. The FY 2019 decrease in the Flank Array Demo (FAD) effort is as originally planned and is based on the focus shift from more costly at-sea testing in FY 2018 to predominantly test result analysis in FY 2019.</p>				
<p>The FY 2019 funding request was reduced by \$2.000 million to account for the availability of prior year execution balances.</p>				
<p>Project 2033:</p> <p>FY 2017: Program Adjustments support CNO Speed to Fleet Initiative for ISR/EW UUV and At-sea rapid prototyping, integration, and advanced submarine payloads demonstration. Additionally increase was programmed by CNO for design and procurement of materials for an advanced coatings demonstration as part of the Acoustic Superiority demonstrator (South Dakota Insertion Program - SSN 790). +\$5.8M in the Request for Additional Appropriation to fund a Joint Emergent Operational Need Statement (JEONS) through the development and rapid prototyping of the Clandestine Delivered Mine (CDM).</p> <p>FY 2018: Increase in the Strategic R&D infrastructure due to obsolescence and tracking range upgrades for LSV-2. This includes installation of new steering and diving prototype funded by FY16 congressional add. Decrease in long-range R&D is due to completion of procurement of long-lead materials (hull treatment) for the SSN-790 demonstration.</p> <p>FY 2019: Increase in Strategic R&D infrastructure due to obsolescence and tracking range upgrades for LSV-2 at ARD Bayview. Conduct design and approval process for replacement Inverter and Converter modules, procure materials and construct prototype units, test units, and revise design as necessary to prepare for full-ship-set production.</p>				
<p>The FY 2019 funding request was reduced by \$2.100 million to account for the availability of prior year execution balances.</p>				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603561N / <i>Advanced Submarine System Development</i>
<p>Project 2096:</p> <p>FY 2017: Decrease of \$4.592 for Payload Handling System (PHS) excess growth. New start program in FY17.</p> <p>FY 2018 to FY 2019: PHS program growth from FY18 to FY19 is required for Long Lead Time Material (LLTM) procurement in order to maintain schedule for installation and testing onboard an SSGN. Additional program growth includes component prototype development and testing, and design and engineering team support.</p> <p>FY 2019: Increase of \$3.498 for Submarine Payload Handling System (PHS).</p> <p>Project 3391:</p> <p>Established in FY18. SSN/SSGN Survivability Program (S3P) previously funded under Project 2033 through FY17.</p>	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603561N / Advanced Submarine System Development				0223 / Sub Combat System Improvement (ADV)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0223: Sub Combat System Improvement (ADV)	485.968	40.626	40.828	47.118	-	47.118	49.531	51.708	51.954	53.053	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Submarine Combat System Improvement (Advanced) (Non-ACAT) Project addresses technology challenges to improve tactical control in littoral and open ocean environments for a variety of operational missions including peacetime engagement, surveillance, battle space preparation, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. These technologies, developed by Navy technology bases, the private sector, ONR, FNC, and DARPA are then transitioned. Prototype hardware/software systems are developed to demonstrate technologically promising system concepts in laboratory and at-sea submarine environments. The Advanced Sensor development program develops and tests new sensors and demonstrates large array configurations. Current efforts are directed at Towed Array sensor technologies, telemetry, and architecture, to improve reliability and performance while decreasing program life cycle costs. For large array configurations, Conformal Acoustic Velocity Sonar (CAVES), Wide Aperture Array (WAA), Large Vertical Aperture (LVA) and Large Flank Array (LFA) technologies are also being pursued. The focus of sensor processing technology efforts through the APB program will address improvements in imaging, tactical control, Electronic Warfare (EW) and acoustics, including detection, localization, classification, ranging, tracking, situational awareness, tactical decision aides, command decision support tools and displays and other functions essential to mission success. APB will also begin to develop capabilities related to Unmanned Aerial and Undersea Vehicles and automated technologies specific to CRIKT.

Technologies and/or capabilities developed under this Project will be shared, as applicable to reduce costs and optimize reuse, with development programs for surface ship sonar, Advanced Capability Build (ACB) and surveillance platforms, Advanced Surveillance Build (ASB). All three programs (ACB, ASB and APB) are managed under a common development process titled AxB. While each platform retains its uniqueness and focus in functional domains essential to mission success, a premium is placed on development of common capabilities and modular architecture technologies to maximize commonality and cost effectiveness.

This Project will participate in, and take advantage of, the Tactical Advancements for the Next Generation (TANG) initiative that utilizes Commercial Industrial Design Thinking methodologies to engage the Fleet in generating innovative improvement concepts for Submarine, Surface and Surveillance systems.

The FY 2019 funding request was reduced by \$2.0 million to account for the availability of prior year execution balances.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Advanced Processing Build (APB)					35.151	35.053	41.993	0.000	41.993
Description: APB is a four Step process:					Articles:	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Step 1 - algorithm/technology assessment by peer review panels of Subject Matter Experts (SME) to down-select technologies and assist developers with technical guidance.						
Step 2 - algorithm/technology testing with open and closed data sets to further down-select and refine capabilities prior to integration and testing.						
Step 3 - land-based system-level testing stimulated by the Submarine Multi-Mission Team Trainer (SMMTT), in a realistic tactical environment.						
Step 4 - at-sea testing on an operational submarine.						
APB requirements are generated by the Submarine Tactical Requirements Group (STRG), a group of senior post command officers chaired by the Flag Officer, Director of Undersea Warfare Development Center (UWDC). Requirements are vetted by COMSUBPAC and COMSUBFOR, then provided as direction by CNO, N97. PEO SUB provides Milestone Decision Authority (MDA) oversight and approval. Beginning in FY17, Steps 1 and 2 are conducted in a pipeline style, parallel to system integration and production. This makes Steps 1 and 2 independent of any particular Build (e.g APB-15) and allows for development of longer lead technologies. The content of a specific APB build (every two years on the odd year) will then be determined through a series of discussions with the Fleet/STRG aimed at selecting the most relevant and mature technologies available in the APB pipeline. Integration at the String and System level will then be performed followed by Steps 3 and 4, as applicable, and transition to production.						
FY 2018 Plans: - Continue the development of APB-17, complete integration for testing, conduct Step 3 land-based laboratory testing and Step 4 at-sea testing and analysis. Transition APB-17 to PEO SUB for production. Establish a Tactical Scenario Guide and conduct a Watch Section Task Analysis (WSTA) Gaps and Seams test to inform system shortfalls in the context of the selected scenarios. - Collaborate with the STRG and UWDC to prepare a multi-year capability development road map to inform the content of the APB Pipeline. Initiate planning and development efforts on APB Pipeline capabilities. - Continue development of a STDA common to submarine, surface, and surveillance applications. - Continue EW APB development program. Analyze data collected in FY 2017. Continue systems engineering studies to determine required legacy system hardware and software architecture modernization requirements. Respond to Fleet requirements for APB-19 capabilities. Initiate selection of candidate capabilities from APB conveyor that meet Fleet requirements and commence development of gap capabilities not resident on the						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
conveyor. Conduct Step 1 and Step 2 testing and initiate the APB-19 systems engineering build design process. Focus of APB-19 is expected to be EW and ASW against advanced threats.						
FY 2019 Base Plans: <ul style="list-style-type: none">- Continue advanced concepts, data collection and analysis for EW APB. Anticipate integrating and testing advanced capabilities into the Next Generation EW Architecture provided by PEO SUBS.- Establish EW APB land-based development environment. Expect to design and procure signal processors, tuners, high speed data recorders, and advanced simulation and stimulation equipment. The development environment should be able to simulate or ingest real world radar data.- Initiate industry participation in EW development. Accept industry innovations for testing at land-based facilities.- Initiate integration of successful capabilities into APB-21 baseline.- Develop improved EW direction finding, environmental assessment, and detection algorithms. Initiate studies and capability development for electronic attack.- Continue development of a STDA common to submarine, surface, and surveillance applications. Begin to export basic development products to Surface and Surveillance programs.- Initiate studies on the use of Machine Learning, AI, and Big Data Analytics. Seek system performance improvements and 3rd Offset (automation) capabilities not currently achievable with legacy technology.- Initiate development of automated technologies specific to CRIKT, targeting particular vulnerabilities.- Integrate APB-19 capabilities and initiate Step-3 land based testing.- Continue Step 1 and Step 2 development and testing of concepts, algorithms, and technologies in response to Fleet requirements consistent with the multi-year capability development road map developed in FY 2018.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2019 increase is driven by the requirement to significantly expand APB advanced development efforts. Advancing capabilities of adversary navies require the application of emerging state-of-the-art computing technologies and development of capabilities in non-traditional tactical areas to compliment the core APB domain. The APB development budget, which began with a limited portfolio developing Towed Array Signal Processing improvements, has since expanded over time, and is required to address Hull Arrays, Tactical Control, Tactical Decision Aids, Active Intercept & Receive, Imaging, Operator Interface Modernization, Command Tool Development, and more recently EW. The APB budget increase in FY 2019 is needed to properly resource its breadth of requirements. The increase in APB is provided to establish a needed land-						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017 FY 2018 FY 2019 Base FY 2019 OCO FY 2019 Total			
based EW capability development laboratory system; conduct new EW algorithm development; pursue the use of Big Data Analytics; Machine Learning and Artificial Intelligence (AI) computing techniques; develop new automation tools and processing for Unmanned Vehicles; and develop automated tools related to CRIKT. APB development added EW to its portfolio in FY 2017 and initial efforts included establishing a systems engineering approach, hiring national-level Subject Matter Experts (SMEs), and collecting data that will be used to initiate new capability development. Efforts in FY 2019 will build on this foundation with further data collections, system refinements, new capability development, and transition to operational use. The ability of our Submarines to operate covertly in forward areas is challenged by the emergence and wide spread use of modern commercial and military radars that exploit software-defined radio technology and can alter their operating characteristics on-the-fly with the use of a thumb drive. These radars and their waveforms are evolving quickly and are expected to continue to present a rapidly moving target for U.S. EW capabilities to keep pace with. A robust APB EW program is needed to enable our Submarines to continue to operate safely and effectively into the future. The use of modern computing technologies and new automation techniques are required to outpace emerging threat platforms that are rapidly becoming more difficult to detect.					
Title: Flank Array Demonstration FY 2018 Plans: - Continue development of beamforming and signal processing improvements to maximize LFA capability as well as tactical/combat system updates making use of improved capabilities to perform target localization. - Conduct two critical at-sea testing events for LVA2 (installed on USS Maryland) and analyze FY 2016/FY 2017 at-sea test results. This testing/analysis is necessary to integrate enhanced signal processing capability for LVAs and to collect data that will be used to improve LVA tactical performance. These processing upgrades are directly applicable to improving the forward and back-fit LVA production programs for Virginia Class Submarines, SSBN's, and Ohio Replacement Submarines. The planned increase supports critical at-sea testing events and the analysis of FY 2016/FY 2017 at-sea test results. FY 2019 Base Plans: - Continue to conduct critical at-sea testing events for LVA2 and analyze FY 2017/FY 2018 at-sea test results. This testing/analysis is necessary to integrate enhanced signal processing capability for LFAs and collect data that will be used to improve LVA tactical performance. These processing upgrades are directly applicable to		Articles: 1.675 - 1.975 - 1.325 0.000 1.325			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
improving the forward and backfit LVA production programs for Virginia Class Submarines, SSBN's, and Ohio Replacement Submarines.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2019 decrease is as originally planned and is based on the focus shift from at-sea testing in FY 2018 to predominantly test result analysis in FY 2019.						
Title: Advanced Sensors Articles: <ul style="list-style-type: none"> - Continue embedded sensor and OAT component development. - Complete second generation OAT component development and design and fabricate towed array modules using OAT to demonstrate high bandwidth operation and dual sample rate capability. Develop initial draft of Interface Control Documents (ICD) for OAT components. - Incorporate lessons learned from FY 2017 Lake Pend Oreille (LPO) testing into FY 2018 array module designs. Update telemetry system layout, architecture, and component designs. Conduct array environmental, calibration, and LPO tow testing of FY 2018 array modules. - Continue development of active and passive sensor concepts to support performance requirements for BCA. Begin preliminary test panel design and procure materials in support of FY 2018 testing. 		3.800	3.800	3.800	0.000	3.800
FY 2018 Plans: <ul style="list-style-type: none"> - Incorporate lessons learned from FY 2018 LPO testing into FY 2019 array module design. Complete OAT component development, system architecture, and associated ICDs. Conduct array environmental, calibration, and LPO testing of FY 2019 array modules. - Begin procurement and fabrication of full length OAT array Advance Development Model (ADM). - Continue development of the High Speed Signal Path (HSSP). - Continue development of active and passive sensor concepts to support performance requirements for BCA. Begin test panel design and procure materials in support of FY 2019 testing. 		-	-	-	-	-
FY 2019 Base Plans: <ul style="list-style-type: none"> - Incorporate lessons learned from FY 2018 LPO testing into FY 2019 array module design. Complete OAT component development, system architecture, and associated ICDs. Conduct array environmental, calibration, and LPO testing of FY 2019 array modules. - Begin procurement and fabrication of full length OAT array Advance Development Model (ADM). - Continue development of the High Speed Signal Path (HSSP). - Continue development of active and passive sensor concepts to support performance requirements for BCA. Begin test panel design and procure materials in support of FY 2019 testing. 						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) No significant change in FY18 to FY19 requested funding in accordance with program's plan.		FY 2017	FY 2018	FY 2019 Base
	Accomplishments/Planned Programs Subtotals	40.626	40.828	47.118
			0.000	47.118
C. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
D. Acquisition Strategy Use competitively awarded contracts from Broad BAA solicitations and SBIR initiatives. Integration to fielded systems performed under contracts awarded by the recipient production program within PEO SUB.				
E. Performance Metrics - APB: Deliver at-sea tested submarine capability improvements to PEO SUB as prescribed by the Fleet every two years. Conduct milestone reviews with the Milestone Decision Authority (MDA), PEO SUB prior to delivery. - Deliver Next Generation TB-29(x) optimum sensor evaluation report. - Deliver Fat Line Vector Sensor Towed Array (VSTA) Lake Pend Oreille test reports.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPFF	Adaptive Methods : VA	1.425	0.250	Dec 2016	0.250	Jan 2018	0.300	Dec 2018	-		0.300	0.000	2.225	Continuing
Product Development	C/CPFF	Alion Sciences : VA	3.267	0.000		0.000		0.000		-		0.000	0.000	3.267	Continuing
Product Development	C/CPFF	Arete : CA	0.550	0.000		0.000		0.000		-		0.000	0.000	0.550	-
Product Development	C/CPFF	Chesapeake Science (L-3) : MD	7.551	0.000		0.000		0.000		-		0.000	0.000	7.551	Continuing
Product Development	C/CPFF	Electric Boat : ME	1.785	0.070	Jul 2017	0.070	Mar 2018	0.070	Dec 2018	-		0.070	Continuing	Continuing	Continuing
Product Development	C/CPFF	General Dynamics : VA	22.031	2.000	Dec 2016	2.500	Feb 2018	3.030	Dec 2018	-		3.030	Continuing	Continuing	Continuing
Product Development	C/CPFF	GA Tech Research Institute : GA	3.076	0.000		0.000		0.000		-		0.000	0.000	3.076	Continuing
Product Development	C/CPFF	In Depth Engineering : VA	5.365	0.970	Nov 2016	0.500	Dec 2017	0.990	Dec 2018	-		0.990	Continuing	Continuing	Continuing
Product Development	C/CPFF	JHU/APL : MD	93.355	8.541	Nov 2016	9.400	Nov 2017	9.884	Dec 2018	-		9.884	Continuing	Continuing	Continuing
Product Development	C/CPFF	Lockheed Martin : VA	63.478	7.812	Nov 2016	8.535	Nov 2017	8.998	Dec 2018	-		8.998	Continuing	Continuing	Continuing
Product Development	C/CPFF	Lockheed Martin : NY	9.564	0.000		0.000		0.000		-		0.000	0.000	9.564	Continuing
Product Development	C/CPFF	Metron : VA	7.253	0.900	Nov 2016	1.000	Nov 2017	1.595	Dec 2018	-		1.595	Continuing	Continuing	Continuing
Product Development	WR	NSWC/Carderock : MD	27.299	2.535	Oct 2016	2.585	Oct 2017	2.720	Nov 2018	-		2.720	Continuing	Continuing	Continuing
Product Development	WR	NUWC/Newport : RI	94.245	6.868	Nov 2016	6.480	Oct 2017	7.670	Nov 2018	-		7.670	Continuing	Continuing	Continuing
Product Development	C/CPAF	NSMA : VA	11.894	0.550	Feb 2017	0.650	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	WR	ONI : DC	2.295	0.000		0.000		0.000		-		0.000	0.000	2.295	Continuing
Product Development	WR	ONR : VA	2.725	0.000		0.000		0.000		-		0.000	0.000	2.725	Continuing
Product Development	C/CPFF	Progeny : VA	7.739	0.535	Nov 2016	0.650	Feb 2018	0.640	Feb 2019	-		0.640	Continuing	Continuing	Continuing
Product Development	C/CPFF	PSU/ARL : PA	9.480	0.850	Nov 2016	0.650	Dec 2017	0.650	Dec 2018	-		0.650	Continuing	Continuing	Continuing
Product Development	C/CPFF	SAIC : VA	3.555	0.000		0.000		0.000		-		0.000	0.000	3.555	Continuing
Product Development	C/CPFF	Sedna Digital : VA	12.264	1.600	Feb 2017	1.650	Dec 2017	1.830	Dec 2018	-		1.830	Continuing	Continuing	Continuing
Product Development	WR	SSC/San Diego : CA	1.963	0.000		0.000		0.000		-		0.000	0.000	1.963	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development						Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)			
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	MIPR	U.S. Army Research Lab : MD	1.700	0.000		0.000		0.000		-		0.000	0.000	1.700	Continuing
Product Development	MIPR	U.S. Army/MITRE : NJ	4.595	0.000		1.408	Dec 2017	1.435	Dec 2018	-		1.435	Continuing	Continuing	Continuing
Product Development	MIPR	U.S. Hanscom AFB/MIT Lincoln Labs : MA	17.289	2.080	Dec 2016	2.150	Dec 2017	2.525	Dec 2018	-		2.525	Continuing	Continuing	Continuing
Product Development	C/CPFF	UT/ARL : TX	28.809	0.775	Nov 2016	0.700	Dec 2017	0.800	Dec 2018	-		0.800	Continuing	Continuing	Continuing
Product Development	C/CPFF	VAR : VAR*	22.723	3.232	Dec 2016	0.592	Dec 2017	3.069	Dec 2018	-		3.069	Continuing	Continuing	Continuing
Subtotal		467.275	39.568		39.770		46.206		-			46.206	Continuing	Continuing	N/A
Remarks *Consists of multiple performing activities with funding for each not greater than \$1M per year.															
Support (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Need Item Text	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal		0.000	0.000		0.000		0.000		-			0.000	0.000	0.000	N/A
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	BAE Systems : MD	12.665	0.000		0.000		0.000		-		0.000	0.000	12.665	Continuing
Program Management Support	C/CPIF	CGI Federal : VA	1.000	1.000	May 2017	1.000	Feb 2018	0.854	Dec 2018	-		0.854	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 0223 / Sub Combat System Improvement (ADV)							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	EG&G (URS) : VA	4.291	0.000		0.000		0.000		-		0.000	0.000	4.291	Continuing
Travel	Allot	NAVSEA PEO IWS5 : DC	0.737	0.058	Dec 2016	0.058	Jan 2018	0.058	Oct 2018	-		0.058	Continuing	Continuing	Continuing
Subtotal		18.693	1.058		1.058		0.912		-		0.912	Continuing	Continuing	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			485.968	40.626		40.828		47.118		-		47.118	Continuing	Continuing	N/A

Remarks

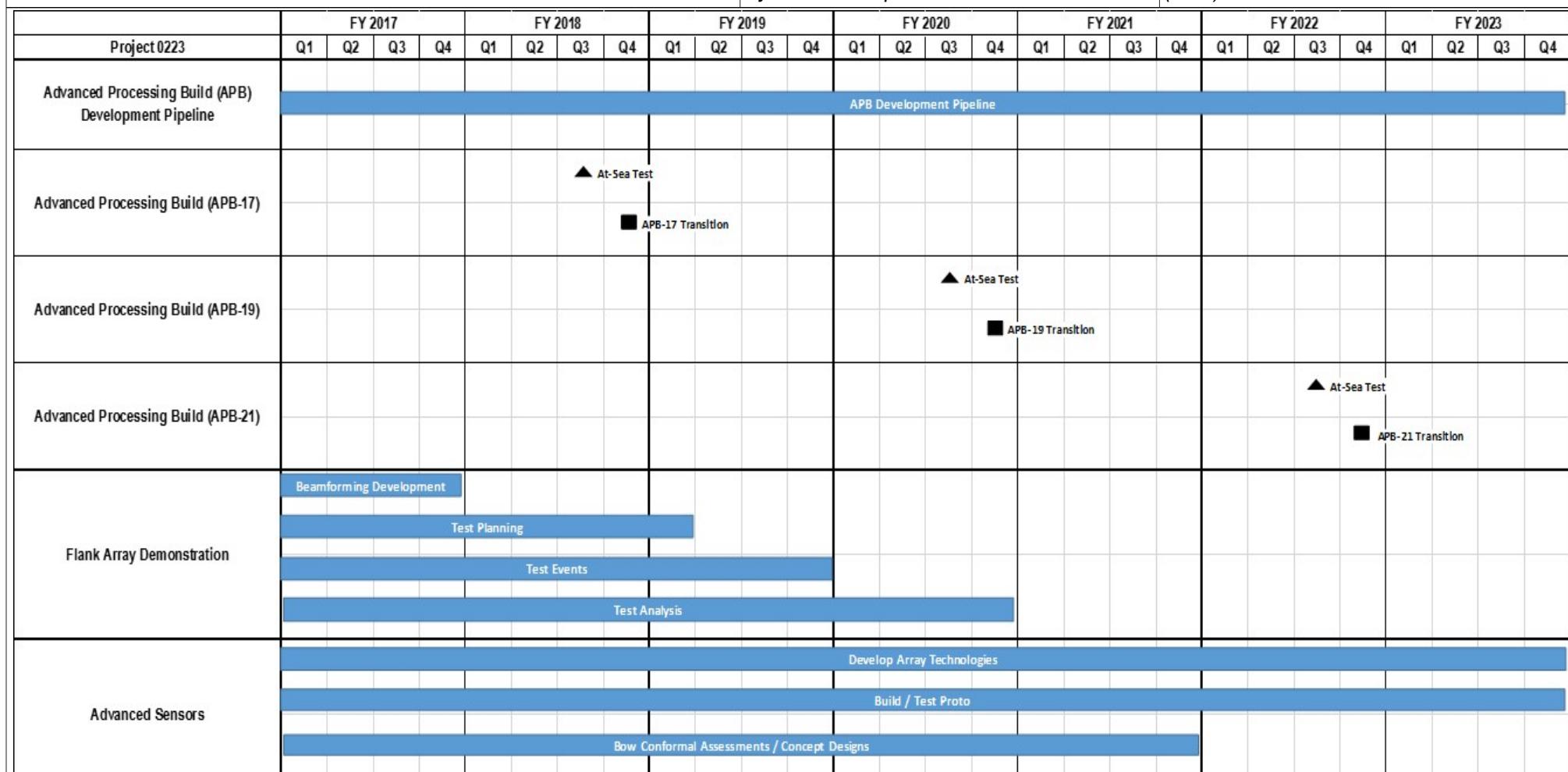
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603561N / Advanced Submarine
System Development**Project (Number/Name)**0223 / Sub Combat System Improvement
(ADV)

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0223				
Advanced Processing Build (APB): APB Development	1	2017	4	2023
Advanced Processing Build (APB): APB-17: APB-17 At-Sea Test	3	2018	3	2018
Advanced Processing Build (APB): APB-17: Transition APB-17 to PEO SUB Production Programs	4	2018	4	2018
Advanced Processing Build (APB): APB-19: APB-19 At-Sea Test	3	2020	3	2020
Advanced Processing Build (APB): APB-19: Transition APB-19 to PEO SUB Production Programs	4	2020	4	2020
Advanced Processing Build (APB): APB-21: APB-21 At-Sea Test	3	2022	3	2022
Advanced Processing Build (APB): APB-21: Transition APB-21 to PEO SUB Production Programs	4	2022	4	2022
Flank Array: Beamforming Development	1	2017	4	2017
Flank Array: Flank Array Test Planning	1	2017	1	2019
Flank Array: Flank Array Test Conduct	4	2017	4	2019
Flank Array: Flank Array Test Analysis	1	2017	4	2020
Advanced Sensors: Develop Array Technologies	1	2017	4	2023
Advanced Sensors: Build & Test Prototype Arrays	1	2017	4	2023
Advanced Sensors: Bow Conformal Assessments / Concept Designs	1	2017	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603561N / Advanced Submarine System Development				2033 / Adv Submarine Systems Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2033: Adv Submarine Systems Development	447.467	51.684	35.795	30.685	-	30.685	32.589	34.917	34.923	35.774	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Submarine Systems Development (ASSD) Program is a non-acquisition program that develops and matures advanced technologies for successful integration into current and future submarine classes and in so doing lowers the technical and cost risks of integrating these new technologies prior to acquisition and speeds their delivery as capabilities into the Fleet and into formal Programs Of Record (PORs). ASSD transitions Hull, Mechanical, and Electrical (HM&E) technologies, payloads, and future naval concepts from the Science & Technology (S&T) and Research and Development (R&D) communities through the development, maturation, and technical integration of technology projects to operational submarine platforms for assessment, testing, and evaluation. Once the projects have proven their maturity and promise through at-sea testing they are formally transitioned into formal programs of record at lower risk and costs. Additionally, ASSD operates and maintains R&D infrastructure assets that are critical in the long-term design, assessment and construction of modern, stealthy submarine platforms.

The program works with Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), Office of Secretary of Defense (OSD), Office of Naval Research (ONR), and Defense Advanced Research Projects Agency (DARPA) organizations to transition technology for integration into current and future submarine classes to achieve new transformational capabilities while achieving total-ownership cost reductions. Experimentation and demonstration are conducted in a joint warfighting context with other services, (i.e. the U.S. Marines, U.S. Army, and the U.S. Air Force), to enable early assessment of the new technology's warfighting capabilities, and to inform the fleet and acquisition community on smarter technology-selection decisions. This program also supports cooperative R&D through Information/Data Exchange Agreements (IEA/ DEA) and joint Project Arrangements (PA) with the United Kingdom, Australia and other international partners. These international cooperative activities achieve future submarine class total ownership cost reductions, and influence future submarine concept designs and core technologies. Overall, the technology efforts in ASSD develop future technologies that are to be integrated into the Virginia class, Columbia class, future submarines and in-service submarine programs.

Several programmatic budget changes are notable in this year's budget exhibits. (1) SEA073 has established new programmatic pillars to better align the different projects within Project 2033 (Strategic Capability R&D Infrastructure, Long Range R&D Investment, and Rapid Technology Development and Ship Integration). The specific project efforts within these new pillars have not changed other than new program starts and completions that are detailed below. (2) The SSN/SSGN Survivability Program (S3P) efforts previously funded under this project (through FY17) were moved to Project 3391 in FY18. The S3P program addresses gaps in stealth and the survivability for the current and future SSN/SSGN force. (3) The increase in funding from FY 2017 to FY 2018 in the Strategic Capability R&D Infrastructure pillar supports critical obsolescence upgrades to the Large Scale Vehicle (LSV-2) to enable its continued operation in support of the Columbia class propulsor test program and future submarine stealth improvements. These investments continue in FY19, (4) The decrease in funding in Long Range R&D is a result of the completion of material procurements and the surge in non-recurring engineering efforts to support installation of the advanced hull treatment advanced demonstrator effort as part of the Acoustic Superiority project on the USS South Dakota (SSN 790) starting in FY18. Future SEA073 investment in advanced hull treatments shifts to the transition of the materials developed as part of ONR's Future Naval Capability (FNC) program that will culminate in another at-sea demonstration in the FY21-22

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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timeframe. (5) Increase in FY17 Rapid Development due to OSD Supplemental Add for the Mining Expendable Delivery Unmanned Submarine Asset (MEDUSA formerly named CDM/Bull Shark); next phase of project execution to complete design, fabricate system, and demonstrate on a 688 class submarine in FY20 has transitioned to Unmanned Maritime Systems program office (PMS406) as of Q4 FY17. Additional funding to cover efforts in FY18-20 are covered under PMS406 AUP/AUWP funding lines.		
Project 2033 is comprised of three programmatic budget categories: Strategic Capability R&D Infrastructure, Long Range R&D Investment, and Rapid Technology Development and Ship Integration. Strategic capability R&D infrastructure is investment to maintain and operate critical, one-of-a-kind submarine R&D assets that enable the design and manufacture of the stealthiest submarines in the world without the requirement to develop and test at full scale which is inordinately expensive and risky. Long-range R&D investment is the maturation and prototyping at full-scale of long- range (5-10 years) technologies to enable their maturation and readiness for incorporation into existing and future submarine baselines. The objective is to achieve high technology readiness (TRL-7) of the targeted technology so that it can be incorporated into the baseline submarine design during the detailed design contract award. Rapid technology development and ship integration projects are efforts designed to mature higher TRL capabilities and field the particular technology project capability within an 18-30 month window from program start to submarine at-sea demonstration. All projects are determined by senior USW leadership and N97 sponsor direction.		
SEA073 additionally initiates seedling technology projects (<\$800K/year) under the innovative technology transition effort to assess new technology candidates and keep the submarine/USW technology pipeline primed. This effort is executed in the Long-Range R&D investment pillar.		
Major technology developmental efforts include: Strategic Capability R&D Infrastructure - Large Scale Vehicle (LSV) - Intermediate Scale Measurement System (ISMS) Long Range R&D - Advanced Submarine Hull Coatings - Advanced Signature Management - Advanced Submarine Control/Stationkeeping - Advanced Material Propeller/Next Generation Thrust (Future Propulsor/Shft Technologies) - Submarine Corrosion Control Technologies Rapid Technology Development and Submarine Integration - Common Unmanned Aerial Vehicle (UAS) Communications - Fleet Modular Autonomous Undersea Vehicle (FMAUV) - Li-Ion Battery for FMAUV Submarine Integration - Mining Expendable Devlivery Unmanned Submarine Asset (MEDUSA). Project transitioned to Unmanned Maritime Systems program office via MOU for execution of Phase II - Long-Range Deployable/Retrievable Instrumented Intelligence, Surveillance and Reconnaissance (ISR) Buoy		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603561N / Advanced Submarine System Development	2033 / Adv Submarine Systems Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Strategic Capability R&D Infrastructure	Articles:	14.825	18.046	18.046	0.000	18.046
Description: Sustains Navy R&D capability for continued operations of the Large Scale Vehicle (LSV-2) and the Intermediate Scale Measurement System (ISMS) test facility in support of VIRGINIA and COLUMBIA Class Programs (plus numerous other smaller programs) and future submarine technology development. Critical submarine stealth enabler. Facilities support the conduct of large scale model experiments for submarines. Facilities focus on evaluating the stealth, control, affordability, and operational effectiveness of new technologies that are prototyped on large-scale models. The technology validation provided by the models has provided significantly cost and schedule savings by allowing prototyping and development at just under full-scale vice with first-of-hull assets.		-	-	-	-	-
FY 2018 Plans: Continue ongoing system upgrades and replacements per scheduled for ISMS. Execute LSV2 core ship systems maintenance, maintain crew qualification, ensure compliance with all LSVSAFE and general regulations. Complete guidance and navigation system upgrade. Upgrade acoustic array assets to support future testing; maintain and operate acoustic data systems and all required shore support systems, ensure calibration and setup of new tracking and control system. Begin build of steering and diving replacement unit. Continue critical COLUMBIA propulsor trials. Execute LSV2 alterations to support COLUMBIA signature and propulsor trials vehicle including tracking range. Execute requirements phase for LSV2 drive system replacement.						
FY 2019 Base Plans: Conduct LSV2 core ship systems maintenance, maintain crew qualification, ensure compliance with all LSVSAFE and general regulations, maintain and operate acoustic data systems and all required shore support systems. Operate and maintain ISMS acoustic test range underwater and shore-based facilities. Continue ongoing system upgrades and replacement on ISMS. Continue critical COLUMBIA propulsor trials, support advanced array hardware and systems maintenance. Support ship and system alterations to safely support COLUMBIA signature and propulsor trials. Install replacement of replacement steering and diving actuator system into LSV2.						
FY 2019 OCO Plans: N/A						
Title: Long Range R&D	Articles:	25.863	11.399	8.282	0.000	8.282

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Develop advanced technologies and tools to increase current and future submarine capabilities, lower acquisition and life-cycle costs, and enhance the survivability of submarines. Develop technologies and Tactics, Techniques, and Procedures (TTPs) that facilitates new and enhance existing warfighting concepts. The program currently supports development of advanced submarine hull coatings for improved acoustic performance, maintainability, and cost with the objective of near-term implementation on VIRGINIA and COLUMBIA class platforms as well as future submarine classes. The budget line continues to develop technologies for submarine alternative propulsion and propulsor designs to enhance submarine maneuverability and stealth, and stern configurations with potential to significantly reduce submarine acquisition costs while increasing performance. Lastly, this long-range R&D continues to develop and demonstrate technologies for future submarines in areas of hull and platform technologies, propulsors, propellers, corrosion control, ship control, electric actuation, sensors, and self-defense systems that are providing near- term capability and cost reduction for in-service and future submarine classes.	FY 2018 Plans: Complete corrosion FNC at-sea TEMPALT testing and baseline technologies in the Columbia, VA Block IV or V Classes. Conduct motor dynamometer testing, and in-water operational pressure testing of the ASC PPM 82 pump jet technology and initiate transition and shipboard integration efforts to introduce the technology as VA Block VI capability. Initiate planning and design for an Advanced Control Effectors technology prototype for land based testing demonstrator on 668 class submarine. Complete fatigue testing of the Advanced Material Propeller (AMP) Generation 2 full scale metallic hub and three composite blades in Australia. Complete the manufacture and testing of Generation 3 full-scale AMP metallic hub and all composite blades and ship to AUS in preparation for at-sea Collins class testing. Finalize trial plan priorities and obtain approval from US and AUS authorities that propeller is acceptable for trial. Continue to leverage products from Small Business and Independent Research and Development (IR&D) efforts. Execute advanced signature management trials on a submarine platform and conduct analysis to inform initial system requirements and capabilities. Assess and study new technologies for future submarines and perform studies to improve platform capability and performance in support of the Tactical Submarine Evolution Plan (TSEP). Identify enabling technologies and submarine concept design integration characteristics. Initiate technology development efforts on critical, long-lead technologies. Continue to define and evaluate new/alternative Next Generation Thrust (NGT) technologies, design concepts, alternative materials and evaluate system configuration arrangements and initiate next gen propulsor technology project (classified details) for insertion in VA Block VII.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	<p>Start second US-UK Electromagnetics project arrangement with laboratory stress magnetization and electric model experiments on joint US/UK models and commencement of detailed planning for large-scale testing to perform underwater electric and magnetic signature testing utilizing US and UK asset(s) at a US range facility. Deliver materials and TDPs to support installation of new hull treatment on SSN 790. Initiate industrialization and large-scale testing of ONR advanced hull material candidates in cooperation with ONR MANTECH and begin initial planning for an at-sea demonstration on a VA class submarine.</p> <p>FY 2019 Base Plans: Remove ICMS, AASGS SCS and AASGS CT TEMPALTs. Complete transitions to COLUMBIA and VA Class programs. Install and test full-scale AMP propeller on Collins-Class submarine and conduct at-sea trials. Initiate follow-on project arrangement for destructive testing and analysis of full-scale propeller data. Continue to leverage products from Small Business and Independent Research and Development (IR&D) efforts and technology seedling efforts. Continue NGT design studies and plan small and/or large scale testing of technologies continue technology development (classified details) for insertion into VA Block VII. Continue industrialization and material assessment to transition advanced coatings technologies from ONR FNC effort. Final tile sizes and coverage for full scale demonstration will be defined to support FY19 OPALT package development for VA Class demonstration. Finalize the industrialization of the ONR advanced treatment, fabrication processes, and down select to a single material candidate to finalize development of a VA Class OPALT package. Execute US-UK submarine EM and acoustic trials at US range and conduct data analysis and begin TDP development for insertion of technology into VA Class Block VI and downstream VA trial. Initiate advanced signature management demonstrator development and begin TDP and test planning development. Complete transition of pump-jet technology to VA Class. Initiate development of the Advanced Control Effectors technology prototype for land based testing. Assess and study future technologies for future submarines and perform studies for improved platform capability and performance in support of the Tactical Submarine Evolution Plan (TSEP).</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: To account for project wide underexecution and funding reduction, several Long-Range R&D pillar projects received targeted reductions in investment, to include the Advanced Hull Treatments, Advanced Signature</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Management, and Advanced SSN Technology/TSEP projects. These budget cuts will be realized via near term reductions in project level of effort/scope and associated extensions of project timelines.						
Title: Rapid Technology Development and Submarine Integration Description: Conducts Navy and joint demonstrations of advanced technologies and payloads in order to assess the operational value of the technologies and systems under consideration to speed transition of operational capabilities. Focus is to develop, demonstrate, and transition technology projects in an 18 -30 month period. Transition successful, high-interest, high impact systems to the acquisition community. FY 2018 Plans: <ul style="list-style-type: none">- Fabricate SAFECAP (fabrication of lithium ion vehicle kit, system level platform checkout testing, development of fully certified submarine integrated TEMPALT), achieve TEMPALT approval and plan at-sea testing of the final submarine SAFECAP hardware and TEMPALT package.- Conduct testing of the common, communication architecture for UAS from a submarine or land-based test facility. Initiate transition to Combat Control System (PMS425), Submarine Imaging & Electronic Warfare (PMS435) program offices. Develop and provide antenna systems for operations (UAS Common Communications) to fleet. Demonstrate E2E capability at the end of FY18 or start of FY19 depending on test platform availability.- Initiate development of long-range, deployable/retrievable instrumented ISR buoy. Initiate TEMPALT design and operational test plan development.- Initiate development of approved Joint Concept Test Demonstration (JCTD) or Undersea Rapid Capability Initiatives (URCI)candidate project. Specific project concept will be developed through low-level demonstration testing. FY 2019 Base Plans: <ul style="list-style-type: none">- Demonstrate the common communications, Unmanned Aerial System (UAS) operation if unperformed in FY18 Q4.- Demonstrate the Lithium Ion SAFECAP FMAUV design in a capstone test. Transition the design into the LBS program of record in the Battlespace Awareness and Information's Operations Program Office (PMW 120).- Continue development of approved Joint Concept Test Demonstration (JCTD)or URCI project. Initiate development of TDP and submarine TEMPALT for initial prototyping and demonstration.	10.996	6.350	4.357	0.000	4.357	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development		Project (Number/Name) 2033 / Adv Submarine Systems Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
- Continue development of the long-range, deployable/retrievable instrumented ISR buoy. Complete TEMPALT development and operational test plan development. Target test of initial capability in FY20.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The Rapid Technology Development and Submarine Integration decrease was largely accounted for in the planned technology transition of the UAS COMMS project to PMS435 and the deferral of follow-on rapid prototyping efforts. While the planned transfer of UAS COMMS project to PMS435 limited impacts to other ongoing projects, the budget decrease within this pillar significantly reduced the overall scope of Project 2033 prototyping.						
Accomplishments/Planned Programs Subtotals						51.684 35.795 30.685 0.000 30.685
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
Non-ACAT program with BA4 R&D investment. Projects transition via formal processes to acquisition programs of record for inclusion into existing ship baselines or initiation as new POR capabilities. Sole source Concept Formulation (CONFORM) contracts with the only two submarine design/construction shipyards, General Dynamics Electric Boat (GDEB) and Huntington Ingalls Industries (HII) facilitate this process. Use of topic-specific Broad Area Announcement (BAA) solicitations to advance submarine advanced technology work. Engagement with industry to build vendor base and support development of R&D products for enhanced submarine capability via competitively awarded Small Business Innovation Research (SBIR) and Broad Agency Agreement (BAA) contracts to support advanced technology Hull Mechanical & Electrical (HM&E) and payload systems.						
E. Performance Metrics						
<ul style="list-style-type: none"> - Sustain critical one of a kind national Research and Development (R&D) hydroacoustic infrastructure enabling the design and assessment of VIRGINIA Class, COLUMBIA Class, and future submarine class designs. - Deliver 2-3 Rapid Prototype projects annually to evaluating future submarine technology/payload concepts. Execute projects in established timelines and under cost cap. Target deliverables as tactical TEMPALTs. - Assess as-built VIRGINIA and SSGN submarines for design drivers/design tools and model validation to define R&D needs for future submarine classes. - Industrialize future submarine coatings to enable continued acoustic superiority of VA Class design and field as and advanced demonstrator. - Successfully construct and deliver full-scale advanced material propeller for at-sea testing. 						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development
- Develop summary report on modeling approaches and associated predicted performance in the area of hull sensors, threat environments, and situational awareness.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 2033 / Adv Submarine Systems Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Product Development	WR	NSWC PHILLY : Philly, PA	0.165	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	WR	NRL : Washington, DC	2.318	0.000		0.000		0.000		-		0.000	0.000	2.318	-
Product Development	SS/CPFF	SupShips : Groton, CT	2.958	0.000		0.000		0.000		-		0.000	0.000	2.958	-
Product Development	SS/CPFF	HII : Newport News, VA	8.580	4.930	Apr 2017	4.954	Apr 2018	3.000	Apr 2019	-		3.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	EB : Groton, CT	61.651	13.134	Apr 2017	2.901	Apr 2018	2.648	Apr 2019	-		2.648	Continuing	Continuing	Continuing
Product Development	WR	NSWC : Carderock, MD	89.213	5.705	Apr 2017	5.750	Apr 2018	5.000	Apr 2019	-		5.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	ARL/PSU : State College, PA	8.428	0.575	Apr 2017	0.580	Apr 2018	0.585	Apr 2019	-		0.585	Continuing	Continuing	Continuing
Product Development	SS/CPFF	JHU/APL : Laurel, MD	21.997	1.200	Apr 2017	1.224	Apr 2018	1.225	Apr 2019	-		1.225	Continuing	Continuing	Continuing
Product Development	Various	Various : Various	35.921	0.289	Apr 2017	0.290	Apr 2018	0.296	Apr 2019	-		0.296	Continuing	Continuing	Continuing
Product Development	WR	NUWC : Newport, RI	76.133	1.820	Mar 2017	1.825	Mar 2018	1.830	Mar 2019	-		1.830	Continuing	Continuing	Continuing
Product Development	WR	ONR : Arlington, VA	10.224	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	SS/CPFF	Progeny : Manassas VA	0.695	0.000		0.000		0.000	May 2019	-		0.000	0.000	0.695	-
Subtotal			318.283	27.653		17.524		14.584		-		14.584	Continuing	Continuing	N/A

Remarks

Various/VAR is used to group multiple activities with small funding levels.

Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 2033 / Adv Submarine Systems Development							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	SS/CPFF	Various : Various	13.617	1.339	Jun 2017	1.340	Jun 2018	1.350	Mar 2019	-		1.350	Continuing	Continuing	Continuing
Government Engineering Support	WR	Various : Various	6.863	0.350	Mar 2017	0.357	Mar 2018	0.364	Mar 2019	-		0.364	Continuing	Continuing	Continuing
Travel	WR	NAVSEA HQ : Not Specified	1.003	0.100	Mar 2017	0.102	Mar 2018	0.104	Mar 2019	-		0.104	Continuing	Continuing	Continuing
Acquisition Workforce	Various	Not Specified : Not Specified	0.293	0.000		0.000		0.000	Nov 2018	-		0.000	0.000	0.293	0.293
Subtotal			21.776	1.789		1.799		1.818		-		1.818	Continuing	Continuing	N/A

Remarks
 Various/VAR is used to group multiple activities with small funding levels.
 Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	EB : Groton, CT	13.698	5.800	May 2017	5.810	May 2018	5.820	May 2019	-		5.820	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWC/PHILLY : PHILLY, PA	9.104	0.000		0.000		0.000	Oct 2018	-		0.000	0.000	9.104	9.104
Developmental Test & Evaluation	Various	Various : Various	7.387	0.670	Apr 2017	0.675	Apr 2018	0.675	Apr 2019	-		0.675	0.000	9.407	6.372
Developmental Test & Evaluation	WR	NUWC : Newport, RI	22.883	7.027	Apr 2017	1.255	Apr 2018	1.050	Apr 2019	-		1.050	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWC : Carderock, MD	43.892	6.745	Apr 2017	6.732	Apr 2018	6.738	Apr 2019	-		6.738	Continuing	Continuing	Continuing
Developmental Test & Evaluation	SS/CPFF	HII : Newport News, VA	5.794	0.000		0.000		0.000	Oct 2018	-		0.000	Continuing	Continuing	Continuing
Developmental Test & Evaluation	SS/CPFF	JHU/ARL : Laurel, MD	3.805	2.000	Apr 2017	2.000	Apr 2018	0.000	Apr 2019	-		0.000	0.000	7.805	0.305

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 2033 / Adv Submarine Systems Development							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	SS/CPFF	ARL/PSU : State College, PA	0.845	0.000		0.000		0.000	Oct 2018	-		0.000	0.000	0.845	0.720
		Subtotal	107.408	22.242		16.472		14.283		-		14.283	Continuing	Continuing	N/A

Remarks
 Various/VAR is used to group multiple activities with small funding levels.
 Activities will be incrementally funded. The award dates reflect the latest incremental portion funds will obligate.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	447.467	51.684		35.795		30.685		-		30.685	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

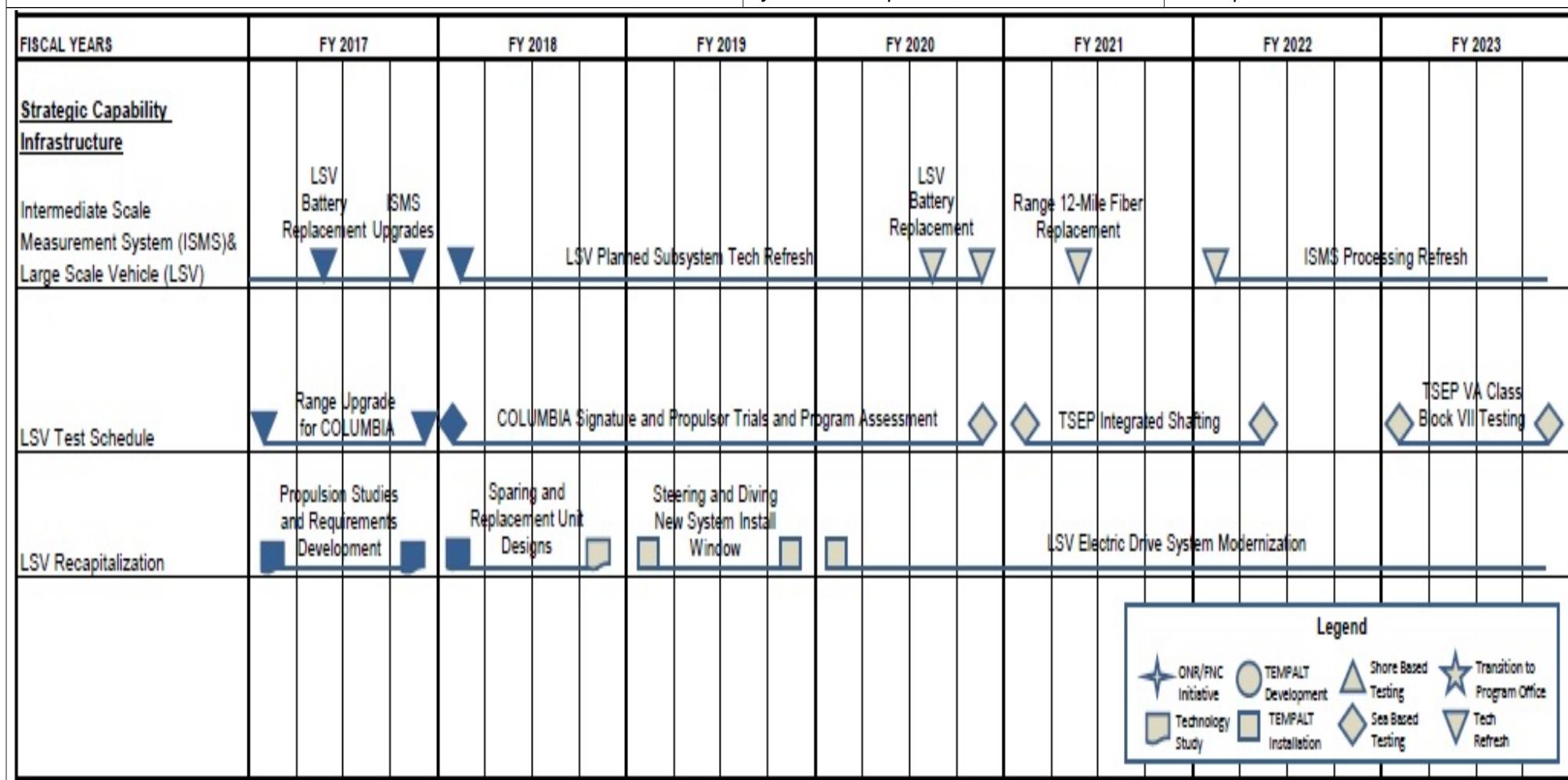
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R-1 Program Element (Number/Name)

PE 0603561N / Advanced Submarine System Development

Project (Number/Name)

2033 / Adv Submarine Systems Development



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

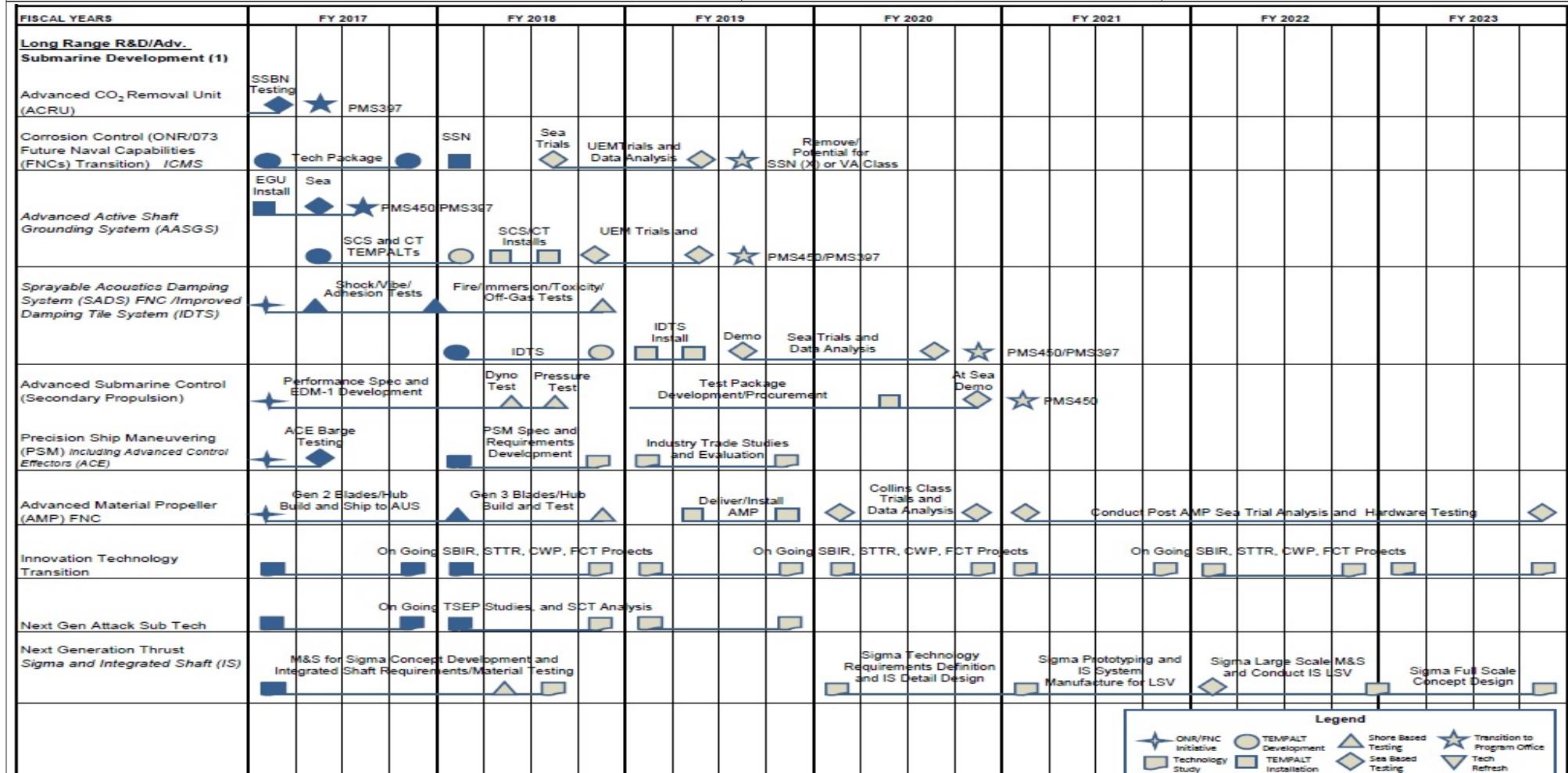
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R-1 Program Element (Number/Name)

PE 0603561N / Advanced Submarine System Development

Project (Number/Name)

2033 / Adv Submarine Systems Development



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

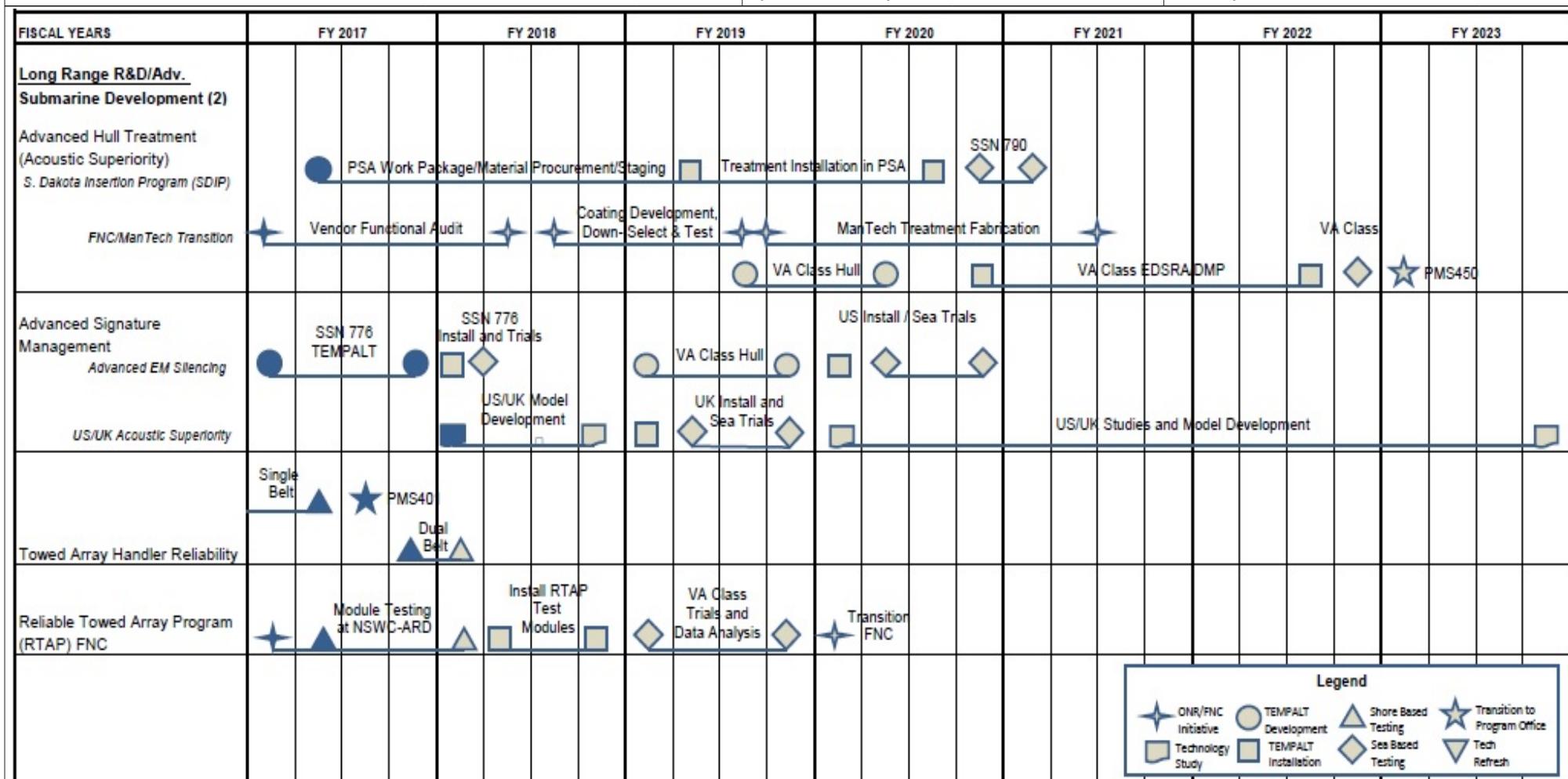
1319 / 4

R-1 Program Element (Number/Name)

PE 0603561N / Advanced Submarine System Development

Project (Number/Name)

2033 / Adv Submarine Systems Development



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

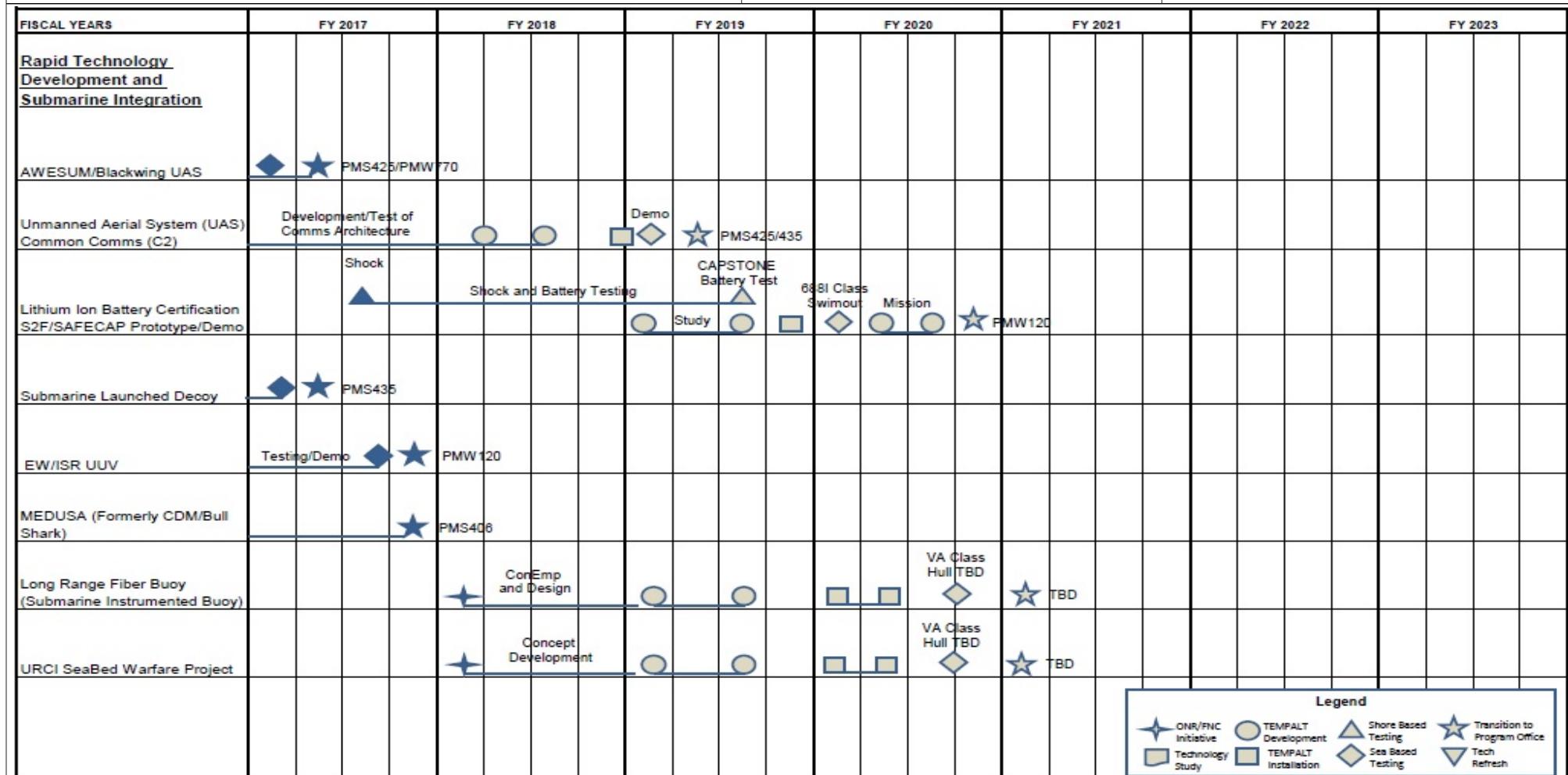
1319 / 4

R-1 Program Element (Number/Name)

PE 0603561N / Advanced Submarine System Development

Project (Number/Name)

2033 / Adv Submarine Systems Development



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 2033</i>				
Strategic Capability Infrastructure: ISMS/LSV - ISMS Upgrades		1	2017	4
Strategic Capability Infrastructure: ISMS/LSV - LSV Planned Subsystem Tech Refresh		1	2018	4
Strategic Capability Infrastructure: ISMS/LSV - Range fiberoptic replacement		2	2021	2
Strategic Capability Infrastructure: ISMS/LSV - ISMS Tech Refresh		1	2022	4
Strategic Capability Infrastructure: ISMS /LSV - Sustainment, Maintenance,Crew Qualification and Operations		1	2017	4
Strategic Capability Infrastructure: ISMS /LSV - Battery Replacement (BR)		3	2017	3
Strategic Capability Infrastructure: ISMS /LSV - BR		3	2020	3
Strategic Capability Infrastructure: LSV Test Schedule - Range Upgrade for LSV		1	2017	4
Strategic Capability Infrastructure: LSV Test Schedule - Propeller Testing		1	2018	1
Strategic Capability Infrastructure: LSV Test Schedule - ONR/ORP Test		2	2019	4
Strategic Capability Infrastructure: LSV Recapitalization - Installation and Testing Window		1	2022	4
Long Range R&D/Advanced Submarine Development: Advanced CO2 Removal Unit (ACRU) - Remove SSBN Shipboard Test Cube		1	2017	1
Long Range R&D/Advanced Submarine Development: Corrosion Control - ICMS - Install ICMS TEMPALT. Complete Pierside and EM trials planning		1	2017	4
Long Range R&D/Advanced Submarine Development: Corrosion Control - ICMS - Perform pierside testing and EM Trial TEMPALT		1	2018	4
Long Range R&D/Advanced Submarine Development: Corrosion Control - AASGS - Monitor EGU TEMPALT at-sea. Install SCS and CT TEMPALTs. Complete SCS and CT Pierside and EM trial TEMPALT planning		1	2017	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development			
Events by Sub Project		Start	End		
Quarter	Year	Quarter	Year		
1	2018	4	2018		
1	2019	4	2019		
1	2017	4	2017		
1	2017	4	2022		
1	2017	4	2017		
1	2018	4	2018		
1	2019	4	2019		
1	2020	4	2020		
1	2021	4	2021		
1	2022	4	2022		
1	2017	4	2022		
1	2017	4	2022		
1	2017	4	2022		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development		
Events by Sub Project		Start	End	
Quarter	Year	Quarter	Year	
Long Range R&D/Advanced Submarine Development: Electromagnetic Signatures Project Arrangement with UK & Advanced Signature Management FNC	1	2017	4	2022
Long Range R&D/Advanced Submarine Development: Advanced Hull Coatings - Joint US/UK Coatings Development and Modeling	1	2017	4	2017
Long Range R&D/Advanced Submarine Development: Advanced Hull Coatings - Transition ONR Future Naval Capability (FNC) Hull Coatings	1	2017	4	2022
Long Range R&D/Advanced Submarine Development: Advanced Hull Coatings - Develop OPALT Treatment pkg and begin Long Lead Procurement	2	2017	2	2017
Long Range R&D/Advanced Submarine Development: Advanced Hull Coatings - Finalize Requirements and Treatment Configuration	3	2017	2	2018
Long Range R&D/Advanced Submarine Development: Advanced Hull Coatings - Treatment Installation, conduct at-sea test on VA Class Submarine	3	2018	4	2019
Long Range R&D/Advanced Submarine Development: Advanced Hull Coatings - Data Analysis	1	2020	4	2022
Long Range R&D/Advanced Submarine Development: Towed Array Reliability Improvement FNC - Conduct at-sea testing and update software tools	1	2017	4	2017
Long Range R&D/Advanced Submarine Development: Towed Array Reliability Improvement FNC - Develop and validate software Tools for Predicting Array Operational Loading & Distribution (FNC)	1	2017	4	2017
Long Range R&D/Advanced Submarine Development: Advanced Signature Management FNC	1	2019	1	2022
Long Range R&D/Advanced Submarine Development: Longe Range Flber Buoy	1	2017	4	2019
Long Range R&D/Advanced Submarine Development: SSN/SSGN (S3P) - Address gaps in stealth and survivability for SSN and SSGNs	1	2017	4	2017
Long Range R&D/Advanced Submarine Development: Operational Survivability Assessment - Annual assessment of states of S3P with respect to adversary capability and available science	1	2017	4	2017
Long Range R&D/Advanced Submarine Development: Operational Survivability - Assessment of SSN/SSGN acoustic health as requested by the SOG	1	2017	4	2017

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development			
		Start		End	
Events by Sub Project	Quarter	Year	Quarter	Year	
Long Range R&D/Advanced Submarine Development: Non-Acoustic Assessment - Assessment of SSN/SSGN non-acoustic health as requested by the SOG	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: SAS Sea Testing - Sub vs. Sub Sea Testing	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: Communication - Model, Test and Analysis	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: Fixed Arrays - Sea Test and Analysis	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: Sea Test Validation Program - Sea Test and Analysis	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: PELAGOS - Commence Project to Program of Record, Initiate VA Tactical version/configuration	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: Submarine Acoustic Superiority (SAS) - Utility Analysis	1	2017	4	2017	
Long Range R&D/Advanced Submarine Development: Countermeasure #1 Development - Update Algorithms	1	2017	4	2017	
Rapid Technology Development and Submarine Integration: AWESUM JCTD - Collaboration on Unmanned Aerial System (UAS) with UK/AUS/Future payload integration	1	2017	4	2022	
Rapid Technology Development and Submarine Integration: Lithium Ion Battery Certification -Complete testing, certification approval, fabrication, TEMPALT TDP	1	2017	4	2017	
Rapid Technology Development and Submarine Integration: Lithium Ion Battery Certification - Approve TEMPALT, conduct at-sea demo. Transition to Battlespace Awareness and Information Operations	1	2018	4	2018	
Rapid Technology Development and Submarine Integration: Submarine Launch Decoy - Mature configuration and conduct At-Sea Test	1	2017	4	2017	
Rapid Technology Development and Submarine Integration: EW/ISR UUV - Demo an autonomous mission capability for EW/ISR	1	2017	4	2017	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2033 / Adv Submarine Systems Development		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	1	2017	4	2018
	1	2017	1	2019
	1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 2096 / Payload Delivery Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2096: <i>Payload Delivery Development</i>	0.000	3.800	15.738	22.956	-	22.956	22.887	12.659	10.188	14.012	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Payload Delivery Development is a non-acquisition program that supports innovative research and development efforts to enable integration of deployable and/or retrievable undersea vehicles, payload concepts, and offboard systems through design, manufacture, test/demonstration, evaluation, and validation for submarine platforms. In addition to technology development, the program will support engineering and integration of new and existing technologies to enable rapid prototyping and fielding of capabilities which will inform and provide solutions to urgent war-fighter needs. Experimentation will be conducted with the Fleet (i.e., Commander, Naval Submarine Forces (COMSUBFOR), Unmanned Undersea Vehicle Squadron One (UUVRON ONE), etc.), enabling an agile environment through at-sea demonstrations, which will provide Fleet and acquisition stakeholders with relevant payload employment data to inform Concepts of Operations (CONOPs) and fielding decisions. The program will furthermore support transition of high-interest systems and/or payloads from research and development to Programs of Record (PoRs), as appropriate.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Payload Handling System (PHS)	3.800	9.038	17.869	0.000	17.869
Articles:	-	-	-	-	-
Description: PHS is used to enable the integration of large deployable and retrievable undersea vehicles, payloads, and offboard systems with large diameter vertical tubes primarily on guided missile (SSGN) and subsequently VIRGINIA class Block V and future submarines. PHS will initially be installed on an SSGN platform to establish proof of concept and demonstrate vertical stowage, launch and recovery capability, and integration for operational employment to influence VIRGINIA Payload Module design. Subsequent PHS application on VIRGINIA Class Block V and future submarines will support fully integrated vertical stowage, launch and recovery capability as a Fleet asset, and operational employment.					
PHS funding will be used to design, manufacture, and field an integrated system to enable vertical stowage, launch and recovery of systems such as the U.S. Navy's Unmanned Undersea Vehicles (UUVs) Family of Systems (FoS) from submarines, a capability which does not currently exist. The PHS will allow the Submarine Force the flexibility to launch and recover advanced systems of various configurations, including the U.S. Navy's UUVs FoSs, in support of critical Undersea Warfare (USW) missions, providing persistent presence and payload capacity. Launch and recovery of the U.S. Navy's UUVs FoSs from submarines will provide critical battle space awareness and extend war-fighting reach as a force multiplier complementary to the fast attack					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
submarine (SSN) fleet. This capability is paramount to countering evolving threats from emerging world powers and maintaining dominance in the undersea domain.						
FY 2018 Plans: Continue NRE to support completion of PDR and transition into critical design of the PHS. Post-PDR plans include transition into a critical design phase, culminating in a critical design review (CDR) planned for late FY19. Approval of design maturity at CDR will support manufacturing, testing, and installation of a PHS onboard an SSGN from FY20 through FY23. Additionally, engineering support for VIRGINIA Class Block V submarine payload integration will allow the establishment of a complete, inclusive technical baseline for the VIRGINIA Payload Module (VPM) that accommodates future payloads and eliminates risk associated with costly and lengthy alterations that would be required to enable hosting of payloads. Specific FY18 tasks required for critical design are as follows: - Payload Handling Element Material Friction Test - Completion of PDR - Commence Critical Design - Payload Handling Element Detailed Design - Hydraulic System Detailed Design - Electrical and Control System Detailed Design - System Schematic and Diagram update based on detailed design - System Arrangement based on detailed design - Detailed Structural Analysis - Detailed Hydrodynamic Load Case Modeling/Analysis - Detailed Shock Modeling/Analysis - Interface Control Documentation - Component Specification Development - Long Lead Material Identification - Manufacturing Cost Estimate Development - Build Strategy Development - Operating Procedure Development - Hazard Assessment Development						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Failure Modes and Effects Analysis						
FY 2019 Base Plans: Continue NRE to support completion of CDR, complete specification development, and execute long lead time material procurements to support transition into manufacturing and testing of the PHS. Approval of design maturity at CDR will support manufacturing, testing, and installation of a PHS onboard an SSGN from FY20 through FY23.						
Specific FY19 tasks required for critical design are as follows:						
- Payload Handling Element Detailed Design						
- Hydraulic System Detailed Design						
- Electrical and Control System Detailed Design						
- System Schematic and Diagram update based on Detailed Design						
- System Arrangement based on Detailed Design						
- Detailed Structural Analysis						
- Detailed Hydrodynamic Load Case Modeling/Analysis						
- Detailed Shock Modeling/Analysis						
- Interface Control Documentation						
- Component Specification Development						
- Long Lead Material Identification						
- Long Lead Material Procurement						
- Manufacturing Cost Estimate Development						
- Build Strategy Development						
- Operating Procedure Development						
- Hazard Assessment Development						
- Failure Modes and Effects Analysis						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Program growth from FY18 to FY19 is required for Long Lead Time Material (LLTM) procurement in order to maintain schedule for installation and testing onboard an SSGN. Additional program growth includes component prototype development and testing, and design and engineering team support. LLTM purchases must be						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
executed in FY19 to support FY20 construction start. Project requires engineering support to facilitate payload integration design efforts on SSGNs and facilitate forward compatibility with VIRGINIA Class Block V submarines with the Virginia Payload Module (VPM). The nominal level of design and integration tasking planned for FY18 will be increased in FY19 to support development of design products which will comprise the technical package for critical design review (CDR) in FY20.						
Title: 3 Inch Submarine Launched Unmanned Aerial System	Articles:	0.000	6.700	5.087	0.000	5.087
Description: The 3" Submarine Launched Unmanned "K" Aerial System (SL-UKAS) project supports the future missions of the VIRGINIA Class Program and its payload module. The project will focus on the overall design, system engineering, prototyping, demonstrations, and qualification activities needed to execute the integration of a "K" payload with a 3" UAS vehicle for rapid deployment with an integrated solution into existing shipboard systems. This system will be demonstrated at a land based facility and at sea by the end of FY20. Capability will transition to the Submarine Combat Control System Program Office (PMS 425) in FY20.		-	-	-	-	-
The following key activities of the 3" SL-UKAS project support a critical capability for USW missions by providing close-in defense for the Submarine Force against adversary systems:						
1. Engineering and integration of existing/proven technology and payloads required to provide a much needed capability to maintain dominance in the undersea domain and extend the operational reach of the Submarine Fleet. 2. Testing and demonstrations necessary to prove out the capability and define CONOPS. 3. Development/testing "safe arm mechanism" to safely stow proposed equipment types onboard submarines.						
FY 2018 Plans: Initiate rapid prototyping and system engineering efforts required for integration of a "K" payload with an existing 3" UAS vehicle design (including review and modification of system requirements, communications, interface and drawings for payload equipment, and system and subsystem detailed design).						
Start/Complete the following Preliminary Design efforts: - Complete prototype contract via Other Transaction Agreement (OTA) - Define system requirements to modify the existing unmanned aerial vehicle(s) and canister with the new payload to minimize major design changes and ensure system safety						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base		
<ul style="list-style-type: none"> - Design modifications to change the initial UAS vehicle to a more modular design which will increase reliability of the vehicle and streamline production manufacturing - Initial payload determination and testing to ensure the payload will accomplish the current Undersea Warfare (USW) mission requirements by providing close-in defense and over-the horizon targeting which will extend the operational reach of our submarine force - Completion of Preliminary Design Review (PDR) and transition into Detailed Design with down selection of competing vehicle designs. <p>FY 2019 Base Plans: Continue rapid prototyping and system engineering efforts required for integration of a "K" payload with an existing 3" UAS vehicle design (including review and modification of system requirements, communications, interface and drawings for payload equipment, and system and subsystem detailed design).</p> <p>Start/Complete the following Vehicle Integration and Testing efforts:</p> <ul style="list-style-type: none"> - Complete Detailed Design and Critical Design Review (CDR) - Long Lead Time Identification and Procurement of material. - Manufacture Prototype of vehicle, canister, and "K" payload - Conduct Test Readiness Review (TRR) - Initiate integration testing of the vehicle, canister, and "K" payload (i.e., Vehicle Dynamics, Payload Precision, Accuracy/Targeting, WSESRR, Shock, IA, etc.) - Initiate demonstration preparations in order to successfully demonstrate the UKAS vehicle with the integrated payload in FY20 (UAS test systems material procurement and builds, development of special test fixtures, and demonstration requirements) <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort.</p>				FY 2019 OCO	FY 2019 Total	
Accomplishments/Planned Programs Subtotals		3.800	15.738	22.956	0.000	22.956
C. Other Program Funding Summary (\$ in Millions)						
N/A						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy <p>Payload Delivery Development is a non-acquisition program that leverages government laboratories, field activities, and industry to enable research and development efforts in support of technology and system development, manufacture, testing, integration and fielding on submarine host platforms. Engage with industry and utilize various contracts (i.e., Other Transaction Agreements (OTAs), sole-source, competitive) from broad solicitations as necessary to facilitate requirements, development, and production support to allow rapid integration of payloads and offboard systems. Technology solutions will transition to appropriate Acquisition Category (ACAT) Program Management Offices (PMOs).</p>		
E. Performance Metrics <p>Payload Handling System (PHS) Completion of Preliminary Design Review (PDR). Commencement of Critical Design.</p> <p>3" Sub Launched Unmanned "K" Aerial System (SL-UKAS) Updated Master Schedule and down-select payload to final design. Development of design documentation and interface control requirements. Completion of Detailed Design Review.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 2096 / Payload Delivery Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NUWC NPT : Newport, RI	0.000	0.265	May 2017	1.174	Oct 2017	1.250	Oct 2018	-		1.250	Continuing	Continuing	Continuing
Product Development	WR	NSWC PD : Philadelphia, PA	0.000	0.904	May 2017	3.275	Oct 2017	6.550	Oct 2018	-		6.550	Continuing	Continuing	Continuing
Product Development	WR	NUWC KPT : Keyport, WA	0.000	1.110	May 2017	3.325	Oct 2017	5.645	Oct 2018	-		5.645	Continuing	Continuing	Continuing
Product Development	WR	PSNS : Bremerton, WA	0.000	0.261	May 2017	1.010	Oct 2017	3.950	Oct 2018	-		3.950	Continuing	Continuing	Continuing
Product Development	WR	NSWC CD : West Bethesda, MD	0.000	0.300	May 2017	0.910	Oct 2017	1.000	Oct 2018	-		1.000	Continuing	Continuing	Continuing
Product Development	WR	NRL : Washington, DC	0.000	0.100	Jul 2017	0.200	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	WR	NSWC DD : Dahlgren, VA	0.000	0.005	Jul 2017	0.021	Oct 2017	0.025	Oct 2018	-		0.025	Continuing	Continuing	Continuing
Product Development	WR	PNS : Portsmouth, NH	0.000	0.527	Dec 2017	0.649	Oct 2017	1.000	Oct 2018	-		1.000	Continuing	Continuing	Continuing
Product Development	C/CPFF	AeroVironment : Simi Valley, CA	0.000	0.000		4.753	Dec 2017	2.599	Dec 2018	-		2.599	Continuing	Continuing	Continuing
Subtotal			0.000	3.472		15.317		22.019		-		22.019	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	NAVSEA HQ : Washington DC	0.000	0.050	May 2017	0.121	Oct 2017	0.122	Oct 2018	-		0.122	Continuing	Continuing	Continuing
Contractor Management Services	C/CPAF	NTT Data : McLean, VA	0.000	0.278	Aug 2017	0.300	Dec 2017	0.815	Dec 2018	-		0.815	Continuing	Continuing	Continuing
Subtotal			0.000	0.328		0.421		0.937		-		0.937	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018	
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development			Project (Number/Name) 2096 / Payload Delivery Development				
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	3.800		15.738	22.956	-	22.956	Continuing	Continuing	N/A
Remarks										

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

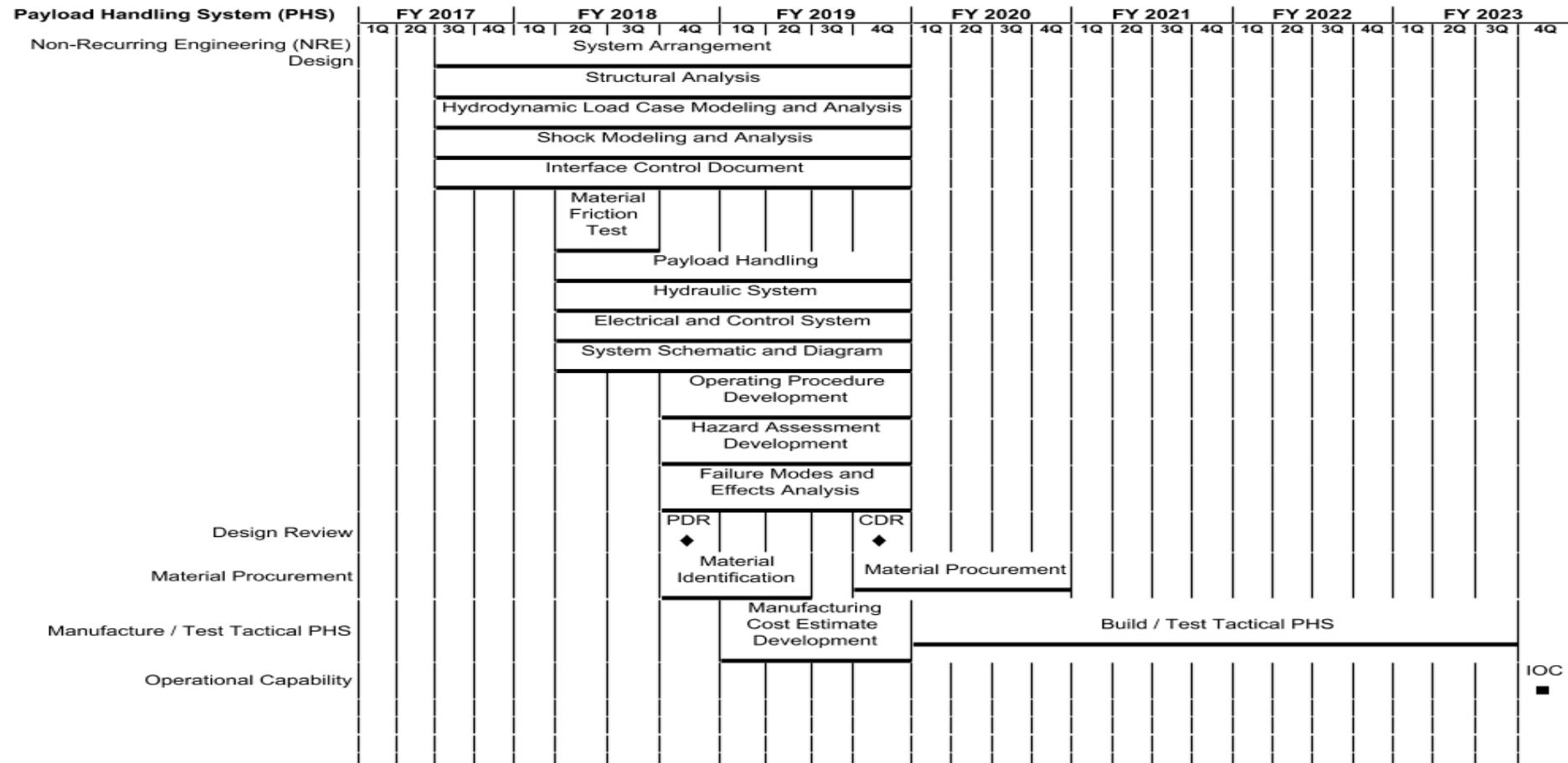
Date: February 2018

Appropriation/Budget Activity

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R-1 Program Element (Number/Name)PE 0603561N / Advanced Submarine
System Development**Project (Number/Name)**

2096 / Payload Delivery Development



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

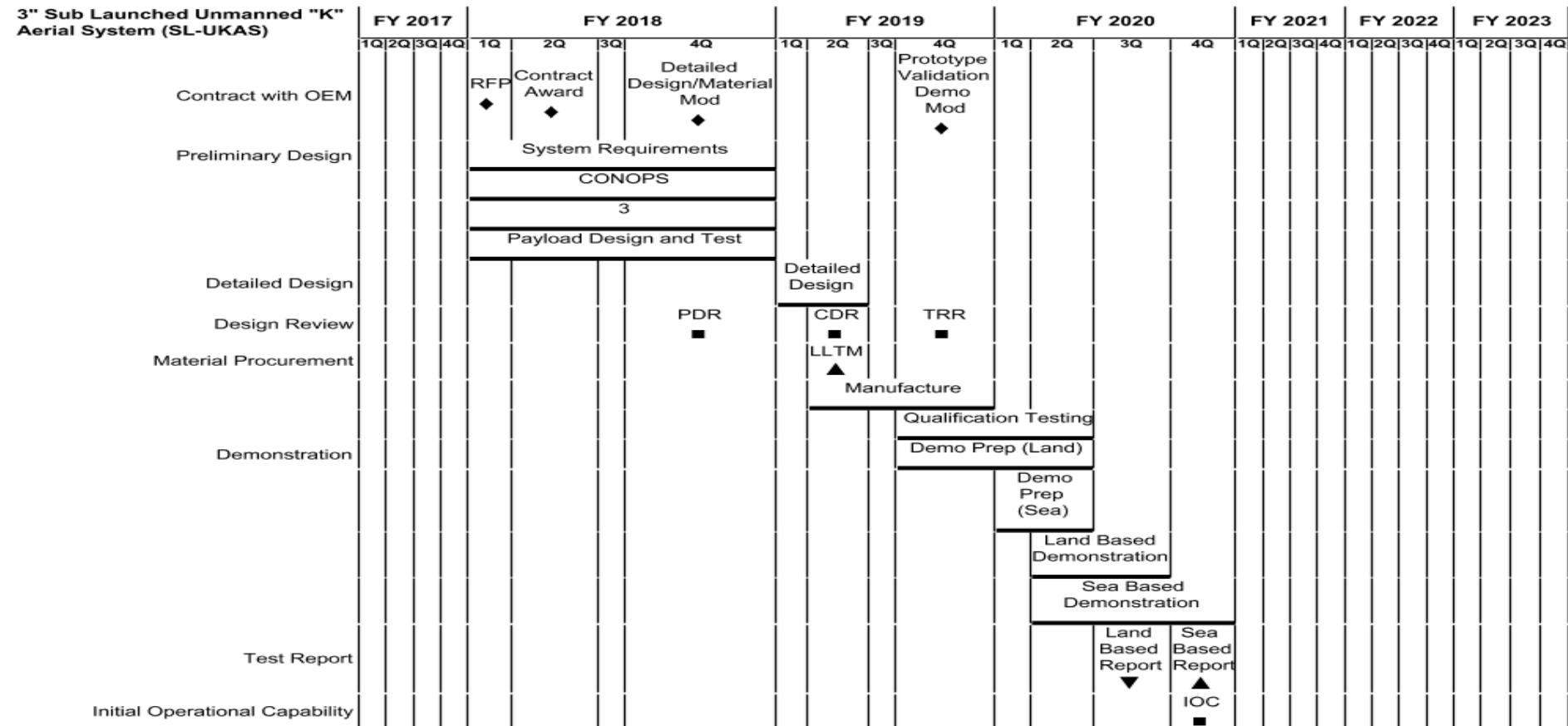
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R-1 Program Element (Number/Name)

PE 0603561N / Advanced Submarine
System Development

Project (Number/Name)

2096 / Payload Delivery Development



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Payload Handling System (PHS)				
Non-Recurring Engineering (NRE) Design: System Arrangement Development	3	2017	4	2019
Non-Recurring Engineering (NRE) Design: Structural Analysis	3	2017	4	2019
Non-Recurring Engineering (NRE) Design: Hydrodynamic Load Case Modeling and Analysis	3	2017	4	2019
Non-Recurring Engineering (NRE) Design: Shock Modeling and Analysis	3	2017	4	2019
Non-Recurring Engineering (NRE) Design: Interface Control Document	3	2017	4	2019
Non-Recurring Engineering (NRE) Design: Payload Handling Element Material Friction Test	2	2018	3	2018
Non-Recurring Engineering (NRE) Design: Payload Handling Element Design Development	2	2018	4	2019
Non-Recurring Engineering (NRE) Design: Hydraulic System Design Development	2	2018	4	2019
Non-Recurring Engineering (NRE) Design: Electrical and Control System Design Development	2	2018	4	2019
Non-Recurring Engineering (NRE) Design: System Schematic and Diagram Development	2	2018	4	2019
Non-Recurring Engineering (NRE) Design: Operating Procedure Development	4	2018	4	2019
Non-Recurring Engineering (NRE) Design: Hazard Assessment Development	4	2018	4	2019
Non-Recurring Engineering (NRE) Design: Failure Modes and Effects Analysis	4	2018	4	2019
Design Review: Preliminary Design Review	4	2018	4	2018
Design Review: Critical Design Review	4	2019	4	2019
Material Procurement: Material Identification	4	2018	2	2019
Material Procurement: Material Procurement	4	2019	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development			
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
Manufacture / Test Tactical PHS: Manufacturing Cost Estimate Development		1	2019	4	2019
Manufacture / Test Tactical PHS: Manufacture / Test Tactical PHS		1	2020	3	2023
Operational Capability: Initial Operational Capability		4	2023	4	2023
3" Sub Launched Unmanned "K" Aerial System (SL-UKAS)					
Contract with OEM: Request for Proposal		1	2018	1	2018
Contract with OEM: Contract Award		2	2018	2	2018
Contract with OEM: Detailed Design/Material		4	2018	4	2018
Contract with OEM: Prototype Validation Demonstration(s)		4	2019	4	2019
Preliminary Design: System Requirements/Interfaces		1	2018	4	2018
Preliminary Design: CONOPS		1	2018	4	2018
Preliminary Design: 3" Vehicle and Canister Modification(s)		1	2018	4	2018
Preliminary Design: Payload Design and Test		1	2018	4	2018
Detailed Design: Detailed Design		1	2019	2	2019
Design Review: Preliminary Design Review		4	2018	4	2018
Design Review: Critical Design Review		2	2019	2	2019
Design Review: Test Readiness Review		4	2019	4	2019
Material Procurement: Long Lead Time Material Identification		2	2019	2	2019
Material Procurement: Manufacture		2	2019	4	2019
Material Procurement: Qualification Testing		4	2019	2	2020
Demonstration: Demonstration Preparation (Land Based)		4	2019	2	2020
Demonstration: Demonstration Preparation (Sea Based)		1	2020	2	2020
Demonstration: Land Based Demonstration		2	2020	3	2020
Demonstration: Sea Based Demonstration		2	2020	4	2020
Test Report: Land Based Report		3	2020	3	2020
Test Report: Sea Based Report		4	2020	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 2096 / Payload Delivery Development		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Initial Operational Capability: Initial Operational Capability	4	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 3391 / SSN/SSGN Survivability Program						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
3391: SSN/SSGN Survivability Program	0.000	0.000	8.594	8.327	-	8.327	8.453	8.600	8.767	8.954	Continuing	Continuing			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-					
A. Mission Description and Budget Item Justification															
Project 3391 SSN/SSGN Survivability Program (S3P): Project realigned in FY18. S3P previously funded under Project 2033 through FY17. The S3P is chartered by OPNAV N97 to assure SSN/SSGN survivability and the ability of submarines to complete their missions even if covert mobility is compromised.															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: SSN/SSGN Survivability Program Articles:											0.000	8.594	8.327	0.000	8.327
Description: The details of project activities are SECRET or higher. The SSN/SSGN Survivability Program (S3P) provides Director, Undersea Warfare Division (OPNAV N97) with qualitative and quantitative analysis of potential SSN and SSGN submarine vulnerabilities based on technology threats and operational requirements and recommends countermeasure concepts to mitigate these potential vulnerabilities. S3P informs the entire \$10B submarine portfolio with validated analysis which informs risk to submarine stealth in contested environments. This analysis also informs methods by which stealth can be regained once compromised to execute missions such as weapons employment. S3P conducts technical analysis validated with at-sea testing. The technical analysis is put into an operational context using data from current submarine operations and also evolving Fleet war plans. S3P develops technologies and tools to increase the survivability of submarines by recognizing and mitigating sources of acoustic and non-acoustic vulnerabilities that put a submarine at risk when penetrating contested waters and operating in the littorals. S3P supports fleet development of Tactics, Techniques, and Procedures (TTPs) that facilitate new or enhance existing warfighting concepts.											-	-	-	-	
FY 2018 Plans: FY 2018, funding for S3P activity shifts from Project 2033 to Project 3391. S3P will continue to address gaps in stealth and survivability for the current and future SSN/SSGN force to include responding to fleet questions on current tactical vulnerabilities and completion of an annual Operational Survivability Assessment. S3P will conduct acoustic and non-acoustic vulnerability assessment projects, and															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development		Project (Number/Name) 3391 / SSN/SSGN Survivability Program	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
will conduct sea tests to better characterize vulnerability and evaluate two developmental Tactical Decision Aids. Details can be provided in a classified setting.					
FY 2019 Base Plans: S3P will continue to address gaps in stealth and survivability for the current and future SSN/SSGN force to include responding to fleet questions on current tactical vulnerabilities and completion of an annual Operational Survivability Assessment. S3P will conduct acoustic, non-acoustic, and non-traditional ASW vulnerability assessment projects, and will conduct sea tests in support of the Acoustic Superiority project along with beginning the transition of two developmental Tactical Decision Aids to programs of record. Details can be provided in a classified setting.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort.					
Accomplishments/Planned Programs Subtotals					0.000 8.594 8.327 0.000 8.327
C. Other Program Funding Summary (\$ in Millions)					
N/A					
Remarks					
D. Acquisition Strategy S3P is a non-acquisition activity which investigates, prioritizes, and validates SSN/SSGN survivability issues for peacetime and all phases of war. S3P also proposes and directs development and validation of countermeasure concepts. S3P works to ensure alignment between OPNAV, NAVSEA, ONI, and the Fleet on survivability issues. S3P will develop recommendations for stealth requirements to OPNAV N97 and provide technical basis for Tactics, Techniques, and Procedures developed by the Undersea Warfighting Development Command (UWDC). S3P will operate under OPNAV N97 and Fleet Flag panel (Operations Review Group) oversight. Products and metrics will be evaluated by the Submarine Operations Group and Operations Review Group. S3P will recommend technical requirements on all matters of submarine survivability to OPNAV N97.					
E. Performance Metrics Conduct in-depth assessment of SSN/SSGN Survivability for peacetime and wartime operations in contested environment. Respond to emergent fleet tasking to assess real-world vulnerability concerns. Complete annual SSN/SSGN Operational Survivability Assessment report for ORG. Conduct 3-4 vulnerability assessments per fiscal					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 3391 / SSN/SSGN Survivability Program
year (each assessment is a 2-12 month level of effort). Conduct 1-3 countermeasure development efforts per fiscal year (each project is a 2-3 year level of effort). Specific technical topics each year are selected based on Fleet needs (as validated by the ORG), evolving threats, and mission requirements.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 3391 / SSN/SSGN Survivability Program								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Product Development	MIPR	CNA: Alex, VA	0.000	0.000		0.447	Jan 2018	0.448	Jan 2019	-		0.448	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	MIT-LL : Cambridge, MA	0.000	0.000		0.626	Oct 2017	0.627	Oct 2018	-		0.627	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.308	Oct 2017	0.309	Oct 2018	-		0.309	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	JHU/APL : Laurel, MD	0.000	0.000		2.263	Oct 2017	2.137	Oct 2018	-		2.137	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	UT/ARL : Austin, TX	0.000	0.000		1.044	Oct 2017	1.045	Oct 2018	-		1.045	Continuing	Continuing	Continuing	
Product Development	WR	NUWC : Newport, RI	0.000	0.000		1.198	Oct 2017	1.159	Oct 2018	-		1.159	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	SPA : Arlington, VA	0.000	0.000		0.208	Dec 2017	0.209	Dec 2018	-		0.209	Continuing	Continuing	Continuing	
Product Development	C/BA	NSMA : Not Specified	0.000	0.000		0.592	Dec 2017	0.592	Dec 2018	-		0.592	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	Applied Mathmetics Int : Gales Ferry, CT	0.000	0.000		0.200	Oct 2017	0.200	Oct 2018	-		0.200	Continuing	Continuing	Continuing	
Product Development	SS/CPFF	Lambda Sciences : Alexandria, VA	0.000	0.000		0.200	Oct 2017	0.100	Oct 2018	-		0.100	Continuing	Continuing	Continuing	
			Subtotal	0.000	0.000		7.086		6.826		-		6.826	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Travel and Corporate	WR	NAVSEA HQ : Not Specified	0.000	0.000		0.420	Oct 2017	0.413	Oct 2018	-		0.413	Continuing	Continuing	Continuing	
			Subtotal	0.000	0.000		0.420		0.413		-		0.413	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development						Project (Number/Name) 3391 / SSN/SSGN Survivability Program				
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation	WR	NSWC : Carderock, MD	0.000	0.000		0.601	Apr 2018	0.601	Apr 2019	-		0.601	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		0.601		0.601		-		0.601	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management Services	SS/CPFF	Sonalyst : Not Specified	0.000	0.000		0.487	Dec 2017	0.487	Dec 2018	-		0.487	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		0.487		0.487		-		0.487	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		8.594		8.327		-		8.327	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

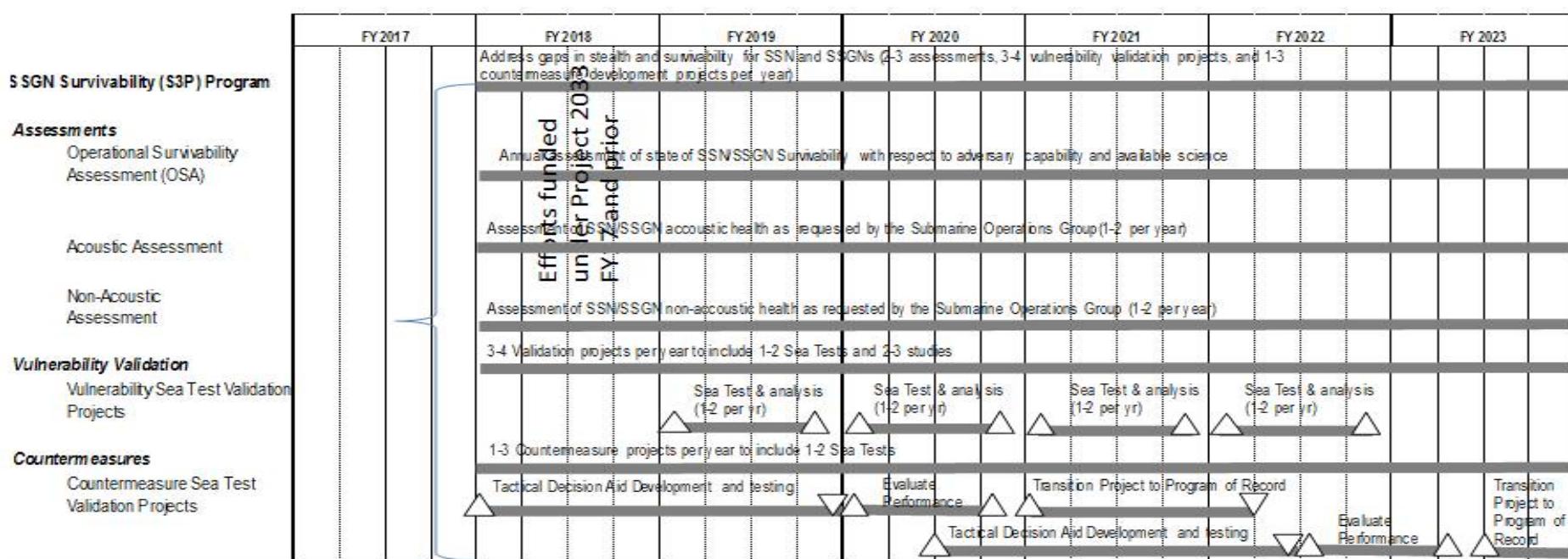
1319 / 4

R-1 Program Element (Number/Name)

PE 0603561N / Advanced Submarine System Development

Project (Number/Name)

3391 / SSN/SSGN Survivability Program



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 3391 / SSN/SSGN Survivability Program

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Assessments				
Operational Survivability Assessment	1	2019	4	2023
Acoustic Assessment	1	2019	4	2023
Non-Acoustic Assessment	1	2019	4	2023
Vulnerability Validation				
Vulnerability Projects (3-4 per year)	1	2019	4	2023
Sea Test Validation Program (1-2 per year)	1	2019	4	2023
Countermeasures				
Countermeasure Validation (2-3 per year)	1	2019	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 9999 / Congressional Adds				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9999: Congressional Adds	0.000	24.179	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	24.179	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification													
Develop a full-scale prototype Advanced Material Propeller (AMP) for demonstration on a Royal Australian Navy submarine. Develop future propulsor design concepts and Next Generation (NG) Thrust technologies. Develop and demonstrate alternative and advanced materials for new integrated shaft and propulsor designs.													
B. Accomplishments/Planned Programs (\$ in Millions)													
<i>Congressional Add:</i> Advanced Materials Propeller Research													
<i>FY 2017 Accomplishments:</i> Completed AMP Structural Certification Plan to obtain approvals from US and AUS authorities that propeller is acceptable for at sea test. Complete testing of AMP Gen 2 full scale hardware to validate acceptance predictions.													
<i>FY 2018 Plans:</i> Complete manufacture of the Advanced Material Propeller (AMP) trial propeller and collection of Objective Quality Evidence (OQE) to support approval of hardware for the sea trial acceptance package. Finalize AMP trial planning and run prioritization in support of US-AUS project arrangement. Complete AMP instrumentation, tool validation and load predictions. Define and evaluate new/alternative Next Generation Thrust (NGT) technologies, perform advanced material studies, develop design simulation tools and define system concepts. Develop an integrated shaft and propulsor design concept and prototype using advanced materials for large scale vehicle demonstration.													
Congressional Adds Subtotals													
24.179 0.000													
C. Other Program Funding Summary (\$ in Millions)													
N/A													
Remarks													
D. Acquisition Strategy													
N/A													
E. Performance Metrics													
Complete all required testing and obtain approvals n the AMP Structural Certification Plan.													

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 9999 / Congressional Adds							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPFF	Seemann Composites Inc : Gulf Port, MS	0.000	13.420	Sep 2017	0.000		0.000		-		0.000	0.000	13.420	-
Product Development	C/CPIF	Rolls Royce Marine : Walpole, MA	0.000	4.563	Sep 2017	0.000		0.000		-		0.000	0.000	4.563	-
Product Development	C/CPFF	Electric Boat : Groton, CT	0.000	0.175	Jul 2017	0.000		0.000		-		0.000	0.000	0.175	-
Product Development	C/CPFF	BAH : Manassas, VA	0.000	0.075	Jul 2017	0.000		0.000		-		0.000	0.000	0.075	-
Product Development	C/CPFF	Alion : Washington, DC	0.000	0.598	Jul 2017	0.000		0.000		-		0.000	0.000	0.598	-
Product Development	C/CPFF	ARL/PSU : Groton, CT	0.000	2.277	Sep 2017	0.000		0.000		-		0.000	0.000	2.277	-
Product Development	C/CPFF	ARL/JHU : Columbia, MD	0.000	0.090	Sep 2017	0.000		0.000		-		0.000	0.000	0.090	-
Product Development	Various	NSWC/CD : Bethesda, MD	0.000	2.881	Jul 2017	0.000		0.000		-		0.000	0.000	2.881	-
Product Development	Various	NSWC/Philadelphia : Philadelphia, PA	0.000	0.075	Jul 2017	0.000		0.000		-		0.000	0.000	0.075	-
Product Development	Various	NRL : Washington, DC	0.000	0.025	Jul 2017	0.000		0.000		-		0.000	0.000	0.025	-
Subtotal			0.000	24.179		0.000		0.000		-		0.000	0.000	24.179	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	SS/CPFF	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development				Project (Number/Name) 9999 / Congressional Adds					
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	24.179		0.000		0.000		-	0.000	0.000	24.179	N/A
<u>Remarks</u>												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018										
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)															
1319 / 4					PE 0603561N / Advanced Submarine System Development					9999 / Congressional Adds															
FY 2017 FY 2018 FY 2019 FY 2020 FY 2021 FY 2022 FY 2023																									
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4																									
Proj 9999																									
Advanced Materials Propeller Research: Advanced Material Propeller Development, Fabrication and Testing					██████████																				
Advanced Materials Propeller Research: Advanced Material Propeller Instrumentation and Tool Validation					██████████																				
Advanced Materials Propeller Research: Advanced Material Propeller Load Predictions					██████████																				
Advanced Materials Propeller Research: Next Generaltion Thrust Concept Development and Testing					██████████																				
Advanced Materials Propeller Research: Integrated Shaft and Propulsor Concept Design Development					██████████																				

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603561N / Advanced Submarine System Development	Project (Number/Name) 9999 / Congressional Adds		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 9999</i>				
Advanced Materials Propeller Research: Advanced Material Propeller Development, Fabrication and Testing		4	2017	4
Advanced Materials Propeller Research: Advanced Material Propeller Instrumentation and Tool Validation		4	2017	4
Advanced Materials Propeller Research: Advanced Material Propeller Load Predictions		4	2017	4
Advanced Materials Propeller Research: Next Generaltion Thrust Concept Development and Testing		4	2017	4
Advanced Materials Propeller Research: Integrated Shaft and Propulsor Concept Design Development		4	2017	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603562N / Submarine Tactical Warfare Sys							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	75.297	8.603	13.834	9.374	-	9.374	11.314	11.551	13.365	12.031	Continuing	Continuing
0770: Adv Sub Supp Equip Prog	18.750	4.419	4.155	4.307	-	4.307	4.672	4.777	4.866	4.977	Continuing	Continuing
1739: Submarine Arctic W/F Development	56.547	4.184	9.679	5.067	-	5.067	6.642	6.774	8.499	7.054	Continuing	Continuing

A. Mission Description and Budget Item Justification

Project 0770 - The Advanced Submarine Support Equipment Program (ASSEP) objective is to improve submarine operational effectiveness through the development and implementation of advanced Research and Development (R&D). In order to provide improved operational effectiveness, R&D efforts are focused on Advanced Imaging Developments and Advanced Electronic Warfare Support (ES) Developments. A continuing need exists to improve these capabilities in view of the advancements in potential imaging counter detection, the need to support specialized missions, and the increasingly dense and sophisticated electronic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Ongoing developments in 360 degree imaging systems and electro-optic infra-red vulnerability signature reduction technologies are supporting these needs.

Project 1739 - The Submarine Arctic Warfare Development Project responds to the increased threat of naval activity in the Arctic regions while continuously supporting the Navy's strategic objective of Assured Access and Combat Credibility. The U.S. Navy Submarine Force (SUBFOR) demonstrates existing Arctic Warfare capabilities, and operational and tactical proficiency, while developing advanced submarine research and development technology in unique cold water environments, under-ice conditions, and ice-covered shallow water regions during Ice Exercises (ICEX). Tactical Development (TACDEV) ICEXs are conducted biennially and require up front comprehensive planning and work-up training, as well as post exercise analysis and reporting. ICEXs provide the framework for various submarine research and development programs to conduct test and evaluation in Arctic regions or at periodic Ice Camps. Particular emphasis is placed on the areas of sonar operability, tactical surveillance, weapon utility, and other submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic specific improvements for existing sonar and weapons, development of class-specific Arctic operational guidelines, and the testing of ice-capable submarine support structures.

Major ICEXs, occurring every four (4) years (FY 2018, FY 2022, etc) include a Fleet requirement to conduct exercise torpedo (EXTORP) firings in the Arctic. A Torpedo Exercise (TORPEX) requires significantly higher level of logistics, personnel, and infrastructure to account for the recovery and transportation efforts of the EXTORPs.

This Project also provides SUBFOR a cadre of trained Arctic Operation Specialists (AOS) and an inventory of unique Arctic sensors to optimize submarine safety during under-ice operations.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	8.782	13.834	9.545	-	9.545
Current President's Budget	8.603	13.834	9.374	-	9.374
Total Adjustments	-0.179	0.000	-0.171	-	-0.171
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.178	0.000			
• Rate/Misc Adjustments	-0.001	0.000	-0.171	-	-0.171

Change Summary Explanation

Project 1739 Funding:

The FY 2018 to FY 2019 decrease is due to the completion of the major TORPEX/TACDEV event in FY 2018. There are no major ICEX events planned in FY 2019; efforts are directed at ICEX 2020 planning/work-up.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys				Project (Number/Name) 0770 / Adv Sub Supp Equip Prog			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0770: Adv Sub Supp Equip Prog	18.750	4.419	4.155	4.307	-	4.307	4.672	4.777	4.866	4.977	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

A continuing need exists to improve Imaging and Electronic Warfare support (EW) capabilities in view of the advancements in potential imaging counter detection and the increasingly dense electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine EW and Imaging to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection, and Joint Strike. The program is divided into two project categories: Advanced Imaging Project Development and Advanced Electronic Warfare Support Project Development. Both of these categories will allow for the mitigation of submarine masts, periscopes, and sensors to visual, radar, and infrared detection. Evaluation of state of the art technology to implement periscope/mast improvements via EW electromagnetic and electro-optic sensors results in improved capability. Engineering Demonstration Models (EDMs) are developed, evaluated, and validated in the lab and through at-sea testing.

The FY19 Advanced Imaging Project Development projects include Anti Reflective Coating Spherical Domes, Volumetric Atmospheric Modeling, Low Power Fiber Delivered Laser Range Finder, Reduced Cost Fabrication of Optical Sapphire Hyper-hemispheres, Vulnerability Improvement, Submarine Meteorological Sensors, System For Non-Acoustic Control of Signatures (SNACS), Imaging Buoy, Near Ocean Imaging through Atmospheric Turbulence and a Project Arrangement (PA) with Australia covering Electromagnetic Spectrum Sensor System Simulation & Development for model-based mission planning.

FY18 to FY19 cost growth is due to test events associated with Anti Reflective Coating Spherical Domes, Volumetric Atmospheric Modeling, and Low Power Fiber Delivered Laser Range Finder.

The FY19 Advanced EW Project Development projects include the development of: Extremely Wideband Digital Receiver (NATO Nunn Project with NAVAIR and Australia), Multi-Functional Apertures, Disposable Decoy Buoys, ISR and Tethered Buoys and Antennas, Radio Frequency (RF) over Fiber (RFoF), Micro Adaptive Training, Mast Antenna Coupler, Ruggedized High speed Optical Fiber Network Connector Interfaces, Data Transmission Using Visible Light Communications (VLC), DISARMER, Digital Early Warning Receiver, Tunable Optic Filters for Radio Frequencies Photonic Signal Distribution Systems and Solid State RADAR Emitter Identification.

All programs funded in this project are non-Acquisition Category (ACAT) programs. The test articles identified consist of critical components that will be fully developed during Engineering Manufacturing and Development phase into EDMs.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Title: Advanced Imaging Project Development	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	3.242	2.360	2.561	0.000	2.561

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
		Articles:	FY 2017	FY 2018	FY 2019 Base
FY 2018 Plans:			-	-	-
Complete TOTIM Land Based ISIS System Architecture Design Development, Testing and Transition to Imaging					
Completed RF Vulnerability Reduction (RAS) Lab Test and Transitioned to Imaging					
Complete Automatic Aircraft Cueing Lab Test and Transition to Imaging					
Complete SBIR- Passive Ranging Development and Transition to Imaging					
Complete GPS Denied Navigation Lab Test and Transition to Imaging					
Complete Meteorological Sensors Test and Continue Development					
Complete Low Power Fiber Delivered Laser Range Finder Lab Test and continue Development					
Complete Reduced Cost Fabrication of Optical Sapphire Hyper-hemispheres Lab Test and Continue Development					
Continue Anti-reflective Coating Spherical Domes Development					
Continue Volumetric Atmospheric Modeling Development					
Continue PA Electromagnetic Spectrum Sensor System Simulation Development					
Start Vulnerability Improvement Development					
Complete RCS Test and Transition to Imaging					
Start System for Non-Acoustic Control of Signatures (SNACS) Development					
Start Near Ocean Imaging through Atmospheric Turbulence Development					
FY 2019 Base Plans:					
Complete Low Power Fiber Delivered Laser Range Finder Lab Test and Continue Development					
Complete Reduced Cost Fabrication of Optical Sapphire Hyper-hemispheres Lab Test and Continue Development					
Complete Anti-reflective Coating Spherical Domes Lab Test and Continue Development					
Complete Volumetric Atmospheric Modeling Lab Test and Continue Development					
Complete PA Electromagnetic Spectrum Sensor System Simulation Lab Test and Continue Development					
Continue SNACS Development					
Continue Vulnerability Improvement Development					
Continue Near Ocean Imaging through Atmospheric Turbulence Development					
Continue Meteorological Sensors Development					
FY 2019 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Complete Disposable Buoy Modular Expendable Intelligence Surveillance and reconnaissance (ISR) Lab Test and Continue Development Complete Tethered Buoy Modular Tethered Antenna Lab Test and Continue Development Complete Tethered Buoy Radio Frequency over Fiber (RFoF) Lab Test and Continue Development Complete Precision DF Lab Test and Transition to EW Complete Multifunction Apertures (SUBSTAR FNC) Lab Test and Transition to EW						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease of \$49 thousand in FY19 from FY18 Advanced Electronic Warfare Development is due to planned increase in Advanced Imaging Development Project Agreement Electromagnetic Spectrum Sensor System Simulation Development efforts in partnership with the Royal Australian Navy.	Accomplishments/Planned Programs Subtotals	4.419	4.155	4.307	0.000	4.307
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
This project optimizes technology insertion using a build-test-build approach to support EW and Imaging operational needs. Operational needs have been based on the tactical requirements identified in the Common Submarine Imaging System (CSIS) (CDD# 849-87-11) dtd 22 Dec 2011 for Submarine Imaging Systems, and the Common Submarine Electronic Warfare System (CSEWS) (CDD# 907-97-16) dtd 27 Sep 2016 for the Electronic Warfare Systems. Project efforts develop submarine unique improvements to mast, periscope, and EW electromagnetic spectrum and electro-optic sensors based on emerging technologies that are available from DoD Exploratory Development Programs, industry Independent Research and Development, and other sources. Engineering Demonstration Models (EDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.						
E. Performance Metrics						
The Research, Development and Demonstration (RDD) program goal is to respond to urgent operational needs within 30 days and provide for rapid development and fielding of prototype solutions within 270 days.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys						Project (Number/Name) 0770 / Adv Sub Supp Equip Prog				
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Systems Engineering	WR	NUWC : RI	16.996	3.378	Nov 2016	4.127	Nov 2017	4.279	Nov 2018	-		4.279	Continuing	Continuing	Continuing	
Primary Software Development	WR	SSC PAC : CA	1.278	0.163	May 2017	0.000		0.000		-		0.000	0.000	1.441	-	
Primary Hardware Development	WR	NSWC CD : MD	0.175	0.260	May 2017	0.000		0.000		-		0.000	0.000	0.435	-	
Primary Software and Hardware Development	MIPR	MIT/LL : MA	0.000	0.590	Jun 2017	0.000		0.000		-		0.000	0.000	0.590	-	
Subtotal			18.449	4.391		4.127		4.279		-		4.279	Continuing	Continuing	N/A	
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Travel	WR	NAVSEA : WNY	0.301	0.028	Nov 2016	0.028	Nov 2017	0.028	Nov 2018	-		0.028	Continuing	Continuing	Continuing	
Subtotal			0.301	0.028		0.028		0.028		-		0.028	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				18.750	4.419		4.155		4.307		-		4.307	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

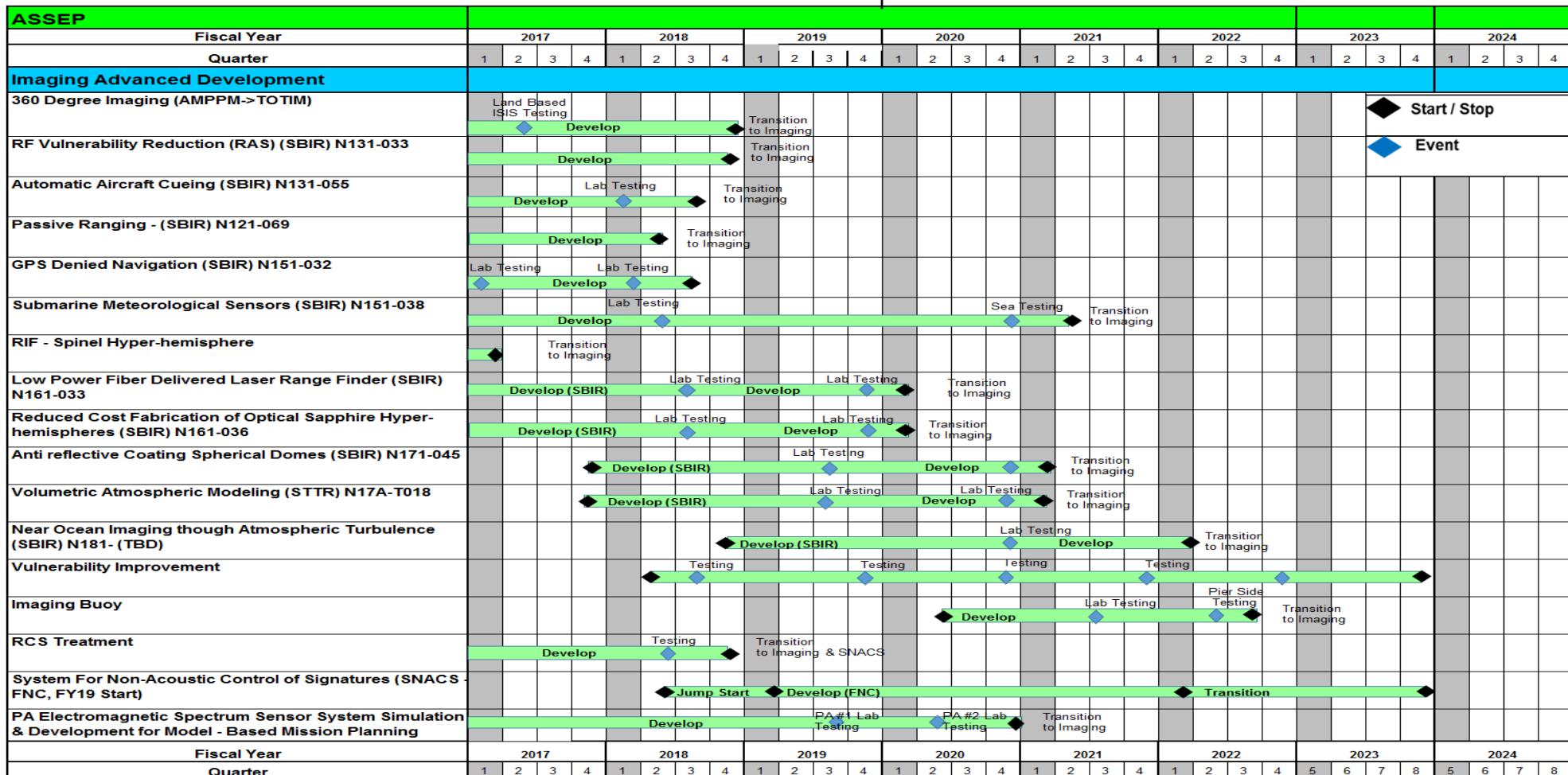
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603562N / *Submarine Tactical Warfare Sys*

Project (Number/Name)
0770 / Adv Sub Supp Equip Prog



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

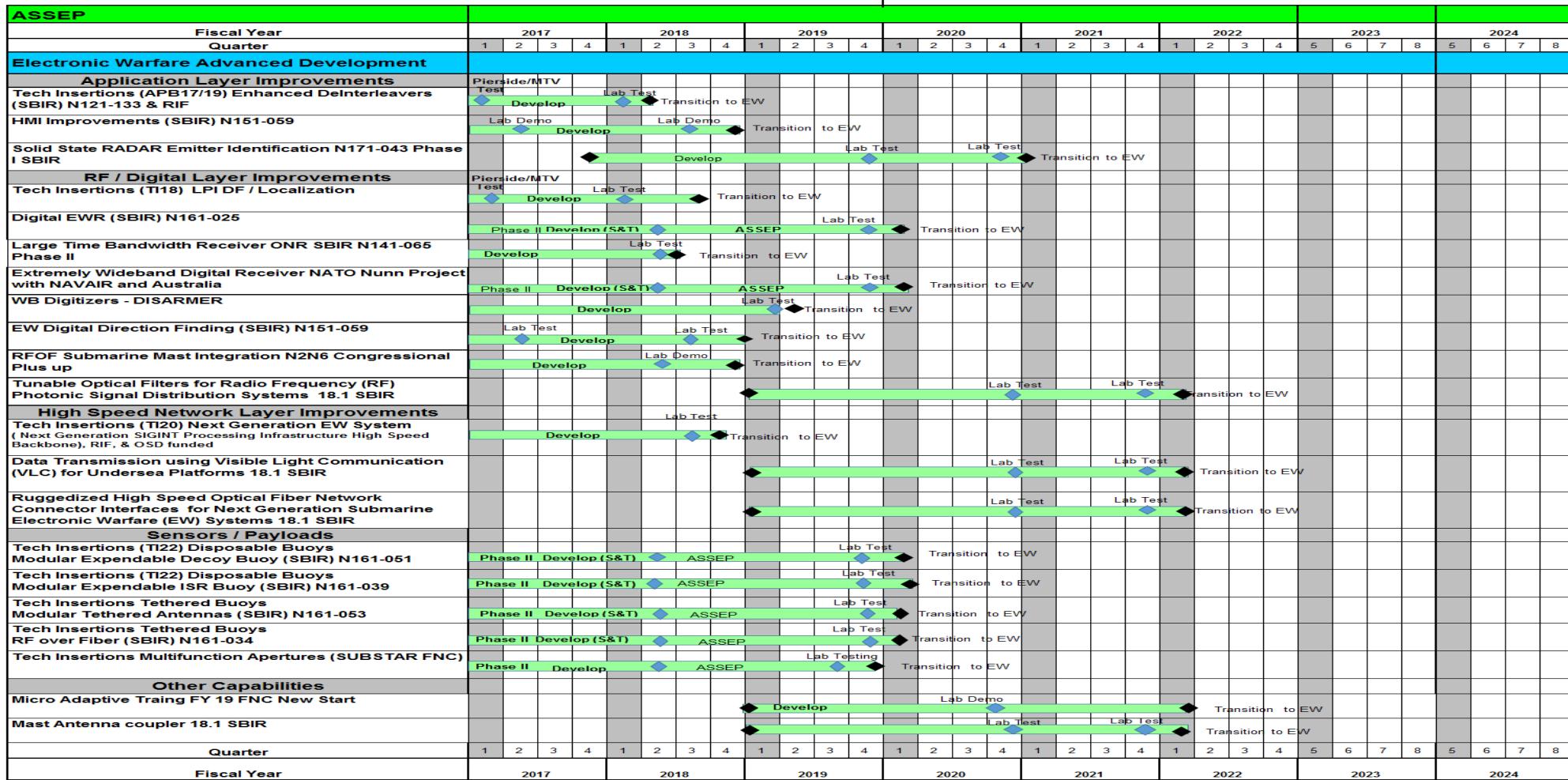
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603562N / Submarine Tactical Warfare Sys

Project (Number/Name)
0770 / Adv Sub Supp Equip Prog



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Imaging Advanced Development</i>				
360 Degree Imaging (TOTIM) Land Based Integration Testing	2	2017	2	2017
360 Degree Imaging (TOTIM) Transition to Imaging	4	2018	4	2018
RF Vulnerability Reduction (RAS)	4	2018	4	2018
Automatic Aircraft Cueing Lab Test	1	2018	1	2018
Automatic Aircraft Cueing Transition to Imaging	3	2018	3	2018
Passive Ranging Transition to Imaging	2	2018	2	2018
GPS Denied Navigation Lab Test	1	2017	1	2017
GPS Denied Navigation Lab Test #2	1	2018	1	2018
GPS Denied Navigation Transition to Imaging	3	2018	3	2018
Submarine Meteorological Sensors Lab Test	2	2018	2	2018
Submarine Meteorological Sensors SeaTest #2	4	2020	4	2020
Submarine Meteorological Sensors Transition to Imaging	2	2021	2	2021
Spinel Hyper-hemisphere Transition to Imaging	1	2017	1	2017
Low Power Fiber Delivered Laser Range Finder Lab Test	3	2018	3	2018
Low Power Fiber Delivered Laser Range Finder Lab Test #2	4	2019	4	2019
Low Power Fiber Delivered Laser Range Finder Transition to Imaging	1	2020	1	2020
Reduced Cost Fabrication of Optical Sapphire Hyper-hemispheres Lab Test	3	2018	3	2018
Reduced Cost Fabrication of Optical Sapphire Hyper-hemispheres Lab Test #2	4	2019	4	2019
Reduced Cost Fabrication of Optical Sapphire Hyper-hemispheres Transition to Imaging	1	2020	1	2020
Anti reflective Coating Spherical Domes Development	4	2017	4	2017

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Anti reflective Coating Spherical Domes Lab Test	3	2019	3	2019
Anti reflective Coating Spherical Domes Lab Test #2	4	2020	4	2020
Anti reflective Coating Spherical Domes Transition to Imaging	1	2021	1	2021
Volumetric Atmospheric Modeling Development	4	2017	4	2017
Volumetric Atmospheric Modeling Lab Test	3	2019	3	2019
Volumetric Atmospheric Modeling Lab Test #2	4	2020	4	2020
Volumetric Atmospheric Modeling Transition to Imaging	1	2021	1	2021
Near Ocean Imaging though Atmospheric Turbulence Development	4	2018	4	2018
Near Ocean Imaging though Atmospheric Turbulence Lab Test	4	2020	4	2020
Near Ocean Imaging though Atmospheric Turbulence Transition to Imaging	1	2022	1	2022
Vulnerability Improvement Development	2	2018	3	2023
Vulnerability Improvement Lab Test	3	2018	3	2018
Vulnerability Improvement Lab Test #2	4	2019	4	2019
Vulnerability Improvement Lab Test #3	4	2020	4	2020
Vulnerability Improvement Lab Test #4	4	2021	4	2021
Vulnerability Improvement Lab Test #5	4	2022	4	2022
Vulnerability Improvement Transition to Imaging	4	2023	4	2023
Imaging Buoy Development	2	2020	2	2020
Imaging Buoy Lab Test	3	2021	3	2021
Imaging Buoy PiersideTest	2	2022	2	2022
Imaging Buoy Transition to Imaging	3	2022	3	2022
RCS Treatment Development	1	2017	1	2017
RCS Treatment Testing	2	2018	2	2018
RCS Treatment Transition to Imaging	4	2018	4	2018
System For Non-Acoustic Control of Signatures (SNACS - FNC, FY18 Jump Start)	2	2018	2	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog			
Events by Sub Project	Start		End		
	Quarter	Year	Quarter	Year	
SNACS FY19 FNC Start	1	2018	1	2018	
SNACS transition to Imaging	4	2023	4	2023	
PA Electromagnetic Spectrum Sensor System Simulation & Dev for Model - Based Mission Planning Test	3	2019	3	2019	
PA Electromagnetic Spectrum Sensor System Simulation & Dev for Model - Based Mission Planning Test #2	2	2020	1	2023	
PA Electromagnetic Spectrum Sensor System Simulation & Dev for Model - Based Mission Planning Transition to Imaging	4	2020	1	2023	
Electronic Warfare Advanced Development: Tech Insertions (APB17/19) Enhanced DeInterleavers Pierside/MTV Test	1	2017	1	2017	
Electronic Warfare Advanced Development: Tech Insertions (APB17/19) Enhanced DeInterleavers Lab Test	1	2018	1	2018	
Electronic Warfare Advanced Development: Tech Insertions (APB17/19) Enhanced DeInterleavers - Transition to EW	2	2018	2	2018	
Electronic Warfare Advanced Development: Digital Early Warning Receiver (EWR) Lab Test	4	2019	4	2019	
Electronic Warfare Advanced Development: Digital Early Warning Receiver (EWR) Transition to EW	1	2020	1	2020	
Electronic Warfare Advanced Development: Extremely Wideband Digital Receiver Lab Test	4	2019	4	2019	
Electronic Warfare Advanced Development: Extremely Wideband Digital Receiver Transition to EW	1	2020	1	2020	
Electronic Warfare Advanced Development: EW Digital Direction Finding Lab Test #1	2	2017	2	2017	
Electronic Warfare Advanced Development: EW Digital Direction Finding Lab Test #2	3	2018	3	2018	
Electronic Warfare Advanced Development: EW Digital Direction Finding Transition to EW	4	2018	4	2018	
Electronic Warfare Advanced Development: HMI Lab Demo	2	2017	2	2017	
Electronic Warfare Advanced Development: HMI Lab Demo #2	1	2018	1	2018	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Electronic Warfare Advanced Development: HMI Transition to EW	2	2018	2	2018
Electronic Warfare Advanced Development: Technical Insertions (TI-18) LPI DF / Localization Pierside/MTV Test	1	2017	1	2017
Electronic Warfare Advanced Development: Technical Insertions (TI-18) LPI DF / Localization Lab Test #2	1	2018	1	2018
Electronic Warfare Advanced Development: Technical Insertions (TI-18) LPI DF / Localization Transition to EW	3	2018	3	2018
Electronic Warfare Advanced Development: Solid State RADAR Emitter Identification Development	4	2017	4	2017
Electronic Warfare Advanced Development: Solid State RADAR Emitter Identification Lab Test	4	2019	4	2019
Electronic Warfare Advanced Development: Solid State RADAR Emitter Identification Lab Test #2	4	2020	4	2020
Electronic Warfare Advanced Development: Solid State RADAR Emitter Identification - Transition to EW	1	2021	1	2021
Electronic Warfare Advanced Development: Large Time Bandwidth Receiver Lab Test	2	2018	2	2018
Electronic Warfare Advanced Development: Large Time Bandwidth Receiver - Transition to EW	3	2018	3	2018
Electronic Warfare Advanced Development: DISARMER Lab Test	1	2019	1	2019
Electronic Warfare Advanced Development: DISARMER - transition to EW	2	2019	2	2019
Electronic Warfare Advanced Development: RFOF Submarine Mast Integration Lab Demo	2	2018	2	2018
Electronic Warfare Advanced Development: RFOF Submarine Mast Integration - Transition to EW	4	2018	4	2018
Electronic Warfare Advanced Development: Tunable Optical Filters for Radio Frequency (RF) Photonic Signal Distribution Systems	1	2019	1	2019
Electronic Warfare Advanced Development: Tunable Optical Filters for Radio Frequency (RF) Photonic Signal Distributions System Lab Test	4	2020	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Electronic Warfare Advanced Development: Tunable Optical Filters for Radio Frequency (RF) Photonic Signal Distribution Systems Lab Test #2	4	2021	4	2021
Electronic Warfare Advanced Development: Tunable Optical Filters for Radio Frequency (RF) Photonic Signal Distribution Systems - Transition to EW	1	2022	1	2022
Electronic Warfare Advanced Development: Next Generation SIGINT Processing Infrastructure High Speed Backbone Lab Test	3	2018	3	2018
Electronic Warfare Advanced Development: Next Generation SIGINT Processing Infrastructure High Speed Backbone - Transition to EW	4	2018	4	2018
Electronic Warfare Advanced Development: Data Transmission using Visible Light Comms(VLC) for Undersea Platforms	1	2019	1	2019
Electronic Warfare Advanced Development: Data Transmission using Visible Light Comms (VLC) for Undersea Platforms Lab Test	4	2020	1	2023
Electronic Warfare Advanced Development: Data Transmission using Visible Light Comms (VLC) for Undersea Platforms Lab Test #2	4	2021	4	2021
Electronic Warfare Advanced Development: Data Transmission using Visible Light Comms (VLC) for Undersea Platforms - Transition to EW	1	2022	1	2022
Electronic Warfare Advanced Development: Ruggedized High Speed Optical Fiber Network Connector Interfaces for NEXGEN EW	1	2019	1	2019
Electronic Warfare Advanced Development: Ruggedized High Speed Optical Fiber Network Connector Interfaces for NEXGEN EW Lab Test	4	2020	4	2020
Electronic Warfare Advanced Development: Ruggedized High Speed Optical Fiber Network Connector Interfaces for NEXGEN EW Lab Test #2	4	2021	4	2021
Electronic Warfare Advanced Development: Ruggedized High Speed Optical Fiber Network Connector Interfaces for NEXGEN EW - Transitions to EW	1	2022	1	2022
Electronic Warfare Advanced Development: TI-22 Disposable Buoys Modular Expendable Decoy Buoy Enhancement - Lab Test	4	2019	4	2019
Electronic Warfare Advanced Development: TI-22 Disposable Buoys Modular Expendable Decoy Buoy Enhancement - Transition to EW	1	2020	1	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog			
Events by Sub Project		Start		End	
Quarter	Year	Quarter	Year		
4	2019	4	2019		
1	2020	1	2020		
4	2019	4	2019		
1	2020	1	2020		
4	2019	4	2019		
1	2020	1	2020		
2	2017	2	2017		
3	2018	3	2018		
4	2018	4	2018		
3	2019	3	2019		
4	2019	4	2019		
1	2019	1	2019		
4	2020	4	2020		
1	2022	1	2022		
1	2019	1	2019		
4	2020	4	2020		
4	2021	4	2021		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 0770 / Adv Sub Supp Equip Prog		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Electronic Warfare Advanced Development: Mast Antenna Coupler Transition to EW	1	2022	1	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603562N / Submarine Tactical Warfare Sys				1739 / Submarine Arctic W/F Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
1739: Submarine Arctic W/F Development	56.547	4.184	9.679	5.067	-	5.067	6.642	6.774	8.499	7.054	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Submarine Arctic Warfare Development Project responds to the increased threat of submarine and surface ship activity in Arctic regions of the world through the development of advanced submarine concepts. It places particular emphasis on submarine operability and mission support in unique, cold, ice-covered environments. Efforts include assessment of combat system effectiveness, weapons testing, use of High Frequency (HF) sonars in Arctic regions, testing of ice-capable submarine structures, and development of class-specific Arctic operational guidelines. This project also provides the framework for various research and development programs to conduct test and evaluation in shallow water and Arctic regions.

Increase in funding from FY 2017 to FY 2018 is driven by the requirement to fund the major TACDEV/TORPEX ICEX events planned in FY 2018, which necessitate additional aviation, personnel, logistics, and torpedo recovery resources than those required for a non-firing (TACDEV only) ICEX event. There are no major TACDEV/TORPEX ICEX events planned in FY 2019. Increase in funding in FY 2019, as compared to FY 2017, is driven by the additional need to conduct Arctic operations to support ice camp equipment evaluation, systems development, and extreme cold weather training, as well as the need to perform drifting sea ice analysis required to improve drifting sea ice camp Arctic operations.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	4.184	9.679	5.067	0.000	5.067
Articles:	-	-	-	-	-
FY 2018 Plans: Conduct Arctic work-up training, ICEX mission 1-2018, and Ice Camp 1-2018. Conduct ICEX 2018 as a TACDEV and TORPEX event. Operate a submarine and torpedo tracking range for approximately 14 days, conduct diver recovery of EXTORPs trapped under-ice, helicopter recover to Ice Camp, backhaul and conduct end or run analysis with on-ice support, return airlift EXTORPs from the Ice Camp back to shore for flushing and return ground transport from Alaska back to Naval Undersea Warfare Center (NUWC), Newport, RI. Support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. Investigate, research, develop and deploy new systems for Arctic submarine support. Support testing and tactical development required to improve submarine Arctic operability and warfighting.					
FY 2019 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 1739 / Submarine Arctic W/F Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Conduct Arctic work-up training. Support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. Investigate, research, develop and deploy new systems for Arctic submarine support. Conduct Arctic operations to support ice camp equipment evaluation, systems development, and extreme cold weather training, and also perform drifting sea ice analysis required to improve drifting sea ice camp Arctic operations. Support testing and tactical development required to improve submarine Arctic operability and warfighting. Initiate planning, logistics support, procurement, and preparation for ICEX mission 2020 and Ice Camp 2020.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2019 decrease is due to the completion of the major TORPEX/TACDEV event in FY 2018. ICEX is conducted on a biennial basis with the off year used to initiate planning, logistics support, procurement, and preparation for the following year's ICEX mission.					
Accomplishments/Planned Programs Subtotals		4.184	9.679	5.067	0.000
C. Other Program Funding Summary (\$ in Millions)					
N/A					
Remarks					
D. Acquisition Strategy					
<ul style="list-style-type: none"> - Use NAVSEA University Affiliated Research Center (UARC) omnibus contract for procurement of an acoustic tracking range service and equipment to support ICEX Ice Camps. - Use sole source and competitively awarded contracts through the U.S. Army Corps of Engineers (USACE) Alaska regional office for ICEX Ice Camp logistics, engineering, and operations support. - Use sole source and competitively awarded contracts through the Fleet Logistics Center (FLC) regional contracting office and Defense Logistics Agency (DLA) for equipment procurement and technical services. 					
E. Performance Metrics					
Conduct and support Arctic deployments, including inter-Fleet transfers and biennial ICEXs, as required by the SUBFOR Commanders.					

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys				Project (Number/Name) 1739 / Submarine Arctic W/F Development							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	COMSUBLANT : VA	2.563	2.694	Oct 2016	4.107	Oct 2017	2.856	Oct 2018	-		2.856	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	COMSUBPAC : CA	36.101	0.000		0.000		0.000		-		0.000	0.000	36.101	-
Developmental Test & Evaluation	WR	NUWC/Newport : RI	0.235	0.000		1.570	Oct 2017	0.000		-		0.000	0.000	1.805	-
Developmental Test & Evaluation	C/CPFF	UT/ARL : TX	1.394	0.040	Jul 2017	0.000		0.050	Dec 2018	-		0.050	0.000	1.484	Continuing
Developmental Test & Evaluation	MIPR	USACE : AK	0.000	0.852	Dec 2016	1.198	Dec 2017	1.358	Dec 2018	-		1.358	0.000	3.408	-
Developmental Test & Evaluation	MIPR	USTRANSCOM : IL	0.000	0.110	Jan 2017	2.100	Dec 2017	0.247	Dec 2018	-		0.247	0.000	2.457	-
Developmental Test & Evaluation	C/CPFF	UW/APL : WA	14.755	0.428	Jul 2017	0.644	Dec 2017	0.496	Dec 2018	-		0.496	Continuing	Continuing	Continuing
Subtotal			55.048	4.124		9.619		5.007		-		5.007	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	EG&G : VA	0.311	0.000		0.000		0.000		-		0.000	0.000	0.311	-
Program Management Support	C/CPAF	BAE SYSTEMS : MD	1.088	0.000		0.000		0.000		-		0.000	0.000	1.088	-
Program Management Support	C/CPIF	TMB : DC	0.060	0.060	May 2017	0.060	Feb 2018	0.060	Dec 2018	-		0.060	Continuing	Continuing	Continuing
Travel	Allot	NAVSEA PEO IWS 5 : DC	0.040	0.000		0.000		0.000		-		0.000	0.000	0.040	-
Subtotal			1.499	0.060		0.060		0.060		-		0.060	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys				Project (Number/Name) 1739 / Submarine Arctic W/F Development					
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	56.547	4.184		9.679		5.067		-	5.067	Continuing	Continuing	N/A
<u>Remarks</u>												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603562N / *Submarine Tactical Warfare Sys*

Project (Number/Name)
1739 / Submarine Arctic W/F Development

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603562N / Submarine Tactical Warfare Sys	Project (Number/Name) 1739 / Submarine Arctic W/F Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 1739				
ICEX Missions: ICEX Mission 2018 (TACDEV / TORPEX) Planning/Logistics	1	2017	1	2018
ICEX Missions: ICEX Mission 2018 (TACDEV / TORPEX)	2	2018	2	2018
ICEX Missions: ICEX Mission 2018 (TACDEV / TORPEX) Post-ICEX Analysis/Reporting	3	2018	4	2018
ICEX Missions: ICEX Mission 2020 (TACDEV) Planning/Logistics	1	2019	1	2020
ICEX Missions: ICEX Mission 2020 (TACDEV)	2	2020	2	2020
ICEX Missions: ICEX Mission 2020 (TACDEV) Post-ICEX Analysis/Reporting	3	2020	4	2020
ICEX Missions: ICEX Mission 2022 (TACDEV / TORPEX) Planning/Logistics	1	2021	1	2022
ICEX Missions: ICEX Mission 2022 (TACDEV / TORPEX)	2	2022	2	2022
ICEX Missions: ICEX Mission 2022 (TACDEV / TORPEX) Post-ICEX Analysis/Reporting	3	2022	4	2022
ICEX Missions: ICEX Mission 2024 (TACDEV) Planning/Logistics	1	2023	4	2023
Ice Camps (Arctic Ocean): Ice Camp (Arctic Ocean) 2018	1	2018	3	2018
Ice Camps (Arctic Ocean): Ice Camp (Arctic Ocean) 2020	1	2020	3	2020
Ice Camps (Arctic Ocean): Ice Camp (Arctic Ocean) 2022	1	2022	3	2022
Arctic Workup (At Sea): Arctic Workup (At Sea)	1	2017	4	2023
Arctic Training: Arctic Training	1	2017	4	2023
Arctic Deployment (At Sea): Submarine Deployment as required by the Submarine Type Commander	1	2017	4	2023
Arctic Transit Mission (At Sea): Arctic Transit Mission (At Sea)	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603563N / Ship Concept Advanced Design							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	190.596	14.359	36.891	89.419	-	89.419	82.387	55.459	24.400	26.204	Continuing	Continuing
2196: Design, Tools, Plans and Concepts	2.347	0.432	23.309	37.267	-	37.267	35.230	21.989	0.683	0.765	Continuing	Continuing
3161: NAVSEA Tech Authority	182.656	9.774	13.582	27.817	-	27.817	33.153	19.343	17.467	19.062	Continuing	Continuing
3376: Strategic Sealift	5.593	4.153	0.000	6.335	-	6.335	6.004	6.127	6.250	6.377	Continuing	Continuing
4037: Common Hull Auxiliary Multi-Mission Platform (CHAMP)	0.000	0.000	0.000	18.000	-	18.000	8.000	8.000	0.000	0.000	0.000	34.000

A. Mission Description and Budget Item Justification

The FY 2019 funding request was reduced by \$1.000 million to account for the availability of prior year execution balances.

Explore alternative surface and expeditionary ship force structures (encompassing amphibious warfare), advanced surface ship and unmanned surface vehicles concepts, and new and emerging technical architectures and solutions in support of pre-acquisition mission needs analysis, mission area analysis and planning, and systems engineering. The objective is a more affordable, mission capable surface ship force including increased ship production capability; ships with reduced manning, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan and NAVSEA Technical Authority with state-of-the-art design tools and methods that develop technical options and requirements for surface ship force structure, ship & unmanned vehicle concepts, advanced material and manufacturing efforts, and improved engineering prototypes and solutions for ships that may become part of the shipbuilding plan.

Project 2196 - This project supports the next step in the development of a transformed naval force by accomplishing Pre Milestone A (especially pre-concept) decision efforts for all potential surface ships, specifically future surface combatants and unmanned surface vehicles supporting the Future Surface Combatant (FSC) Analysis of Alternatives (AoA). These efforts are the required first step in the definition and integration of total ship systems, including combat systems, weapons systems and Hull, Mechanical and Electrical (HM&E) systems. This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Efforts include advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods and criteria.

Project 3161 - This project is the only R&D effort that provides a coordinated approach to the development of cross platform ship and weapon system designs and technologies 'common' to multiple ships and systems. This project directly informs technical standards for design, construction, certification and operation and provides an avenue for innovative solutions and technologies to compete with legacy product requirements and specifications. This project conducts risk reduction of alternative technical architectures, designs and technology solutions that meet Fleet operational and technical requirements at lower cost, and develops engineering capabilities in the areas of design tools, criteria and methods. This project funds a prioritized portfolio of time-sensitive initiatives through the Cross Platform Systems Development (CPSD) program, supporting NAVSEA Technical Authority and associated risk reduction activity. The areas of exploration for CPSD include Ship Technology Improvements, Fleet Maintenance and Life Cycle Cost Reduction, Advanced Manufacturing and Material Technology, Digital Framework/Electromagnetic

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)					
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0603563N / Ship Concept Advanced Design					
Environment and Development and Unmanned Systems and Cyber security. The research products developed by this project directly support and influence both in-service fleet requirements and future acquisition programs by providing a range of technically acceptable alternatives and evaluation of emerging technologies. The prototypes, standards/specs, tools and processes and other products developed in this project focus on technical requirements and technologies applicable to multiple ship classes or systems. Products from this project transition directly to early-stage ship design for Ship Preliminary Design and Feasibility Studies, Program Executive Office (PEO) ship acquisition programs, and Systems Engineering Technical Authority (SETA) requirements documentation. Tasks within this project include R&D efforts focused on increasing sustainment technologies and improving performance at reduced cost for current and future naval platforms.						
Project 3376 - Strategic Sealift Research and Development - Develops new concepts and technologies which can be applied to or will enable future strategic sealift, and Seabasing systems. The technologies include ship configuration concepts, equipment to increase cargo handling and cargo loading/unloading rates (including commercial and merchant ship systems), improved man/machine interfaces, improved structural configurations and materials, and Logistics-Over-the-Shore (LOTS) equipment and system improvements. FY2018, FY2016, and prior years efforts were funded under the National Defense Sealift Fund (NDSF) BA 04 Project 3116 Strategic Sealift Research and Development.						
Project 4037 - This project supports Common Hull Auxiliary Multi-Mission Platform (CHAMP)Design and Total Ship Integration. The CHAMP concept leverages a new approach to requirements generation and shipbuilding to replace aging mission specific designs with a common hull to reduce life cycle costs, leverage tailored payloads, and stabilize the industrial base. Identified missions include: sealift, aviation intermediate maintenance support, medical services, command & control, and submarine tending. Funding will inform requirements definition, early industry engagement and follow-on assessment across CHAMP mission functionality.						
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Previous President's Budget	14.590	36.891	47.662	-	47.662	
Current President's Budget	14.359	36.891	89.419	-	89.419	
Total Adjustments	-0.231	0.000	41.757	-	41.757	
• Congressional General Reductions	-	-				
• Congressional Directed Reductions	-	-				
• Congressional Rescissions	-	-				
• Congressional Adds	-	-				
• Congressional Directed Transfers	-	-				
• Reprogrammings	-	-				
• SBIR/STTR Transfer	-0.211	0.000				
• Program Adjustments	0.000	0.000	43.054	-	43.054	
• Rate/Misc Adjustments	0.000	0.000	-1.297	-	-1.297	
• Congressional General Reductions	-0.020	-	-	-	-	
Adjustments						
Change Summary Explanation						
Proj: 3161 NAVSEA Tech Authority						

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>
Increase = \$13.000 million - funds added for comprehensive set of cyber warfighting capabilities to meet existing Fleet cybersecurity gaps, added distributed cyber test capability, cyber test and assessment capability and cybersecurity T&E policy, directives and requirements.	
Increase = \$6.700 million - funds additive manufacturing to provide increased Fleet readiness and improve warfighting capacity by enabling production at or near the point of need.	
Decrease = -\$1.000 million - The FY 2019 funding request was reduced by \$1.000 million to account for the availability of prior year execution balances.	
Proj: 3376 Strategic Sealift Increase = \$6.335 million - National Defense Sealift Fund (NDSF) disestablished transferring funds into RDTEN.	
Proj: 4037 Common Hull Auxiliary Multi-Mission Platform (CHAMP) Increase = \$18.000 million - funds new program to start early industry studies for a replacement to several ship classes for CHAMP Design and Total Ship Integration efforts.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603563N / Ship Concept Advanced Design				2196 / Design, Tools, Plans and Concepts			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2196: Design, Tools, Plans and Concepts	2.347	0.432	23.309	37.267	-	37.267	35.230	21.989	0.683	0.765	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides the foundation for an affordable and mission capable surface ship force. It also supports the next step in the development of a transformed naval force by accomplishing the pre-milestone A (especially pre-concept decision) efforts for all potential surface ships. These efforts are the required first step in the integration of total ship systems, including combat systems, weapons systems and Hull, Mechanical and Electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result in down-stream design, construction and operational problems. A more subtle and severely negative impact of neglecting this early effort is that the "best" concepts and technologies may never even be considered and the greatest potential ship design advances never realized. Designs and technologies must consider how to meet the threat. This project supports this requirement.

This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria are also funded in this project.

This project:

- (1) Develops alternative surface ship force structure concepts including the ships and unmanned vehicles.
- (2) Evaluates the mission capability effectiveness and costs for these alternative surface fleet architectures.
- (3) Performs fleet war fighting/mission effectiveness assessment studies.
- (4) Identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs.
- (5) Investigates new affordable ship concepts and evaluates technologies necessary to support these concepts.
- (6) Provides design methods and automated design tools to develop and evaluate ship concepts.
- (7) Supports development of Initial Capabilities Documents (ICD) and analogous early requirements documents for future ships.

These efforts are done to support analysis; mission needs development and technology assessment in support of future fleet concepts and potential ship acquisition programs. These efforts are fundamental to the Navy's formulation of the future fleet requirements.

These efforts supports and maintains naval ship design and engineering capabilities in the design phase of developing concept design tools, criteria and methods.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design	Project (Number/Name) 2196 / Design, Tools, Plans and Concepts				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Ship Concepts and Mission Need Analysis	Articles: -	0.432	0.452	0.473	0.000	0.473
Description: Develop ship concepts and perform analysis for potential ships and Force Architecture 10-30 years out in shipbuilding plan.						
FY 2018 Plans: Develop engineering tools, methods, and criteria used for ship designs. Advance methodologies and tools for expediting ship design.						
FY 2019 Base Plans: Evaluate multi-mission effectiveness and costs, and develop ship concept designs.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Minor adjustments from FY18 to FY19.						
Title: Future Surface Combatant Studies	Articles: -	0.000	22.857	36.794	0.000	36.794
Description: This effort will lay the analytic foundation for the development of the Future Surface Combatant (FSC) post Capabilities Based Assessment. Ships produced from this effort will fill critical gaps in the fleet in the 2030 timeframe created by the decommissioning of CG 47, DDG 51, and LCS 1/2 ships. Unmanned vehicle efforts will expand conops to decouple mission capability from manned force structure.						
FY 2018 Plans: Conduct ship design and unmanned vehicle studies to support analytic foundation for the development of a Future Surface Combatant post Capabilities Based Assessment (CBA).						
Develop FSCs and associated unmanned surface vehicles including mission payloads, sensors and handling systems.						
Define technical requirements for: modular unmanned system mission payloads, common control systems, launch & recovery (L&R) system concepts						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>				Project (Number/Name) 2196 / <i>Design, Tools, Plans and Concepts</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Develop technical requirements and standards for unmanned system autonomous operations, define host ship technical requirements and interface standards											
<p>FY 2019 Base Plans: The support necessary to support a Request For Proposal (RFP) for Preliminary Design by FY20 requires a significant increase in human capital (both government and contractor) to perform the requisite studies and analyses necessary to develop, finalize and evaluate system and mission requirements; and develop Milestone-documentation in support of Preliminary Design. Funding will also be used to continue to conduct ship design and unmanned vehicle studies to support analytic foundation for the development of a Future Surface CBA. Develop FSCs and associated unmanned surface vehicles including mission payloads, sensors and handling systems. Define technical requirements for: modular unmanned system mission payloads, common control systems, L&R system concepts.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, an additional \$13.937M is required to complete full Analysis of Alternatives for Future Surface Combatant to support a Request For Proposal (RFP) for Preliminary Design by FY20.</p>											
Accomplishments/Planned Programs Subtotals						0.432	23.309	37.267	0.000	37.267	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTEN/0204202N: <i>DDG-1000</i>	45.187	140.500	161.264	-	161.264	132.337	133.781	88.573	16.617	Continuing	Continuing
• RDTEN/0603512N: <i>Carrier Systems Development</i>	7.516	9.296	5.440	-	5.440	5.401	5.531	5.637	5.778	Continuing	Continuing
• RDTEN/0603564N: <i>Ship Preliminary Design/Feasibility</i>	13.451	12.012	13.348	-	13.348	22.534	9.320	9.494	9.687	Continuing	Continuing
• RDTEN/0604567N: <i>Ship Contract Design/Live Fire T&E</i>	82.946	67.166	60.062	-	60.062	59.688	54.596	55.677	56.859	Continuing	Continuing
• RDTEN/0603582N: <i>Combat System Integration</i>	23.839	24.674	16.351	-	16.351	27.921	16.015	15.509	26.496	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>					Project (Number/Name) 2196 / <i>Design, Tools, Plans and Concepts</i>	
C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete
Remarks										
D. Acquisition Strategy This is a non-acquisition program that develops, evaluates, and validates early stages of total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for those concept designs and assessments.										
E. Performance Metrics Quarterly Program Reviews Monthly Reviews										

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 2196 / Design, Tools, Plans and Concepts							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	Various Contractors : Various	0.584	0.000		0.715	Feb 2018	4.000	Feb 2019	-		4.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Various	0.906	0.000		1.375	Feb 2018	1.000	Feb 2019	-		1.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC DD : Dahlgren, VA	0.000	0.000		5.500	Nov 2017	2.250	Nov 2018	-		2.250	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC PL : Philadelphia, PA	0.000	0.000		3.125	Nov 2017	2.750	Nov 2018	-		2.750	Continuing	Continuing	Continuing
Systems Engineering	WR	SPAWAR : San Diego, CA	0.000	0.000		1.375	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	JHU APL : Baltimore, MD	0.000	0.000		3.219	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC CD : Carderock, MD	0.000	0.000		0.000		4.000	Oct 2018	-		4.000	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	Various Contractors : Various	0.171	0.000		0.000		7.127	Feb 2019	-		7.127	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC CD : Carderock, MD	0.637	0.432	Jan 2017	8.000	May 2018	6.460	Nov 2018	-		6.460	Continuing	Continuing	Continuing
Engineering Development	C/BA	NSWC : Various	0.000	0.000		0.000		1.610	Feb 2019	-		1.610	Continuing	Continuing	Continuing
Demonstration & Evaluation	C/CPFF	Various Contractors : Various	0.029	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test & Evaluation	C/CPFF	Various Contractors : Various	0.020	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC PL : Philadelphia, PA	0.000	0.000		0.000		4.440	Nov 2018	-		4.440	0.000	4.440	-
Engineering Development	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		3.630	Nov 2018	-		3.630	0.000	3.630	-
Subtotal			2.347	0.432		23.309		37.267		-		37.267	Continuing	Continuing	N/A

Remarks

Significant increases for Systems Engineering and Engineering Development tasking with both contractor and Navy Warfare Center activities stems from requirement to complete full Analysis of Alternatives to support and issue a Request For Proposal for Preliminary Design by FY20.

This funding is essential to:

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>						Project (Number/Name) 2196 / <i>Design, Tools, Plans and Concepts</i>					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
<ul style="list-style-type: none"> - Ensure participation in AoA/requirements development teams to examine the alternative concepts and feasibility of acquisition strategies - Prepare required documents for Alternative Systems Reviews (ASR) after the AoA and Navy determines preferred material solution(s) - Perform operational & technical analysis on preferred material solutions - Establish program framework and strategies - Prepare required Milestone A documents for preferred material solution(s) - Develop technology development strategy 															
		Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		2.347	0.432		23.309		37.267		-		37.267	Continuing	Continuing	N/A	
Remarks															

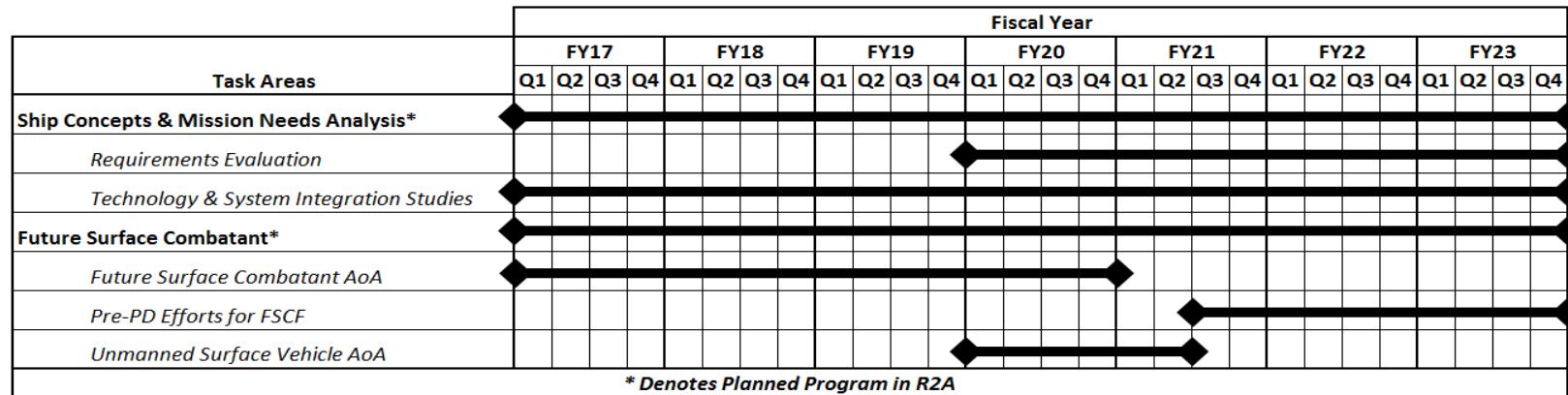
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603563N / *Ship Concept Advanced Design***Project (Number/Name)**2196 / *Design, Tools, Plans and Concepts*

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>	Project (Number/Name) 2196 / <i>Design, Tools, Plans and Concepts</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2196				
Ship Concepts and Mission Needs Analysis	1	2017	4	2023
Requirements Evaluation	1	2020	4	2023
Technology & System Integration Studies	1	2017	4	2023
Future Surface Combatant	1	2017	4	2023
Pre-Preliminary Design Efforts for Future Surface Combatant Force	1	2021	4	2023
Unmanned Surface Vehicle AoA	1	2020	4	2021
Future Surface Combatant AoA	1	2017	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 3161 / NAVSEA Tech Authority			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3161: NAVSEA Tech Authority	182.656	9.774	13.582	27.817	-	27.817	33.153	19.343	17.467	19.062	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

All Cross Platform System Development (CPSD) Pillars have been rebaselined in FY19 to better address CNO and NAVSEA Chief Engineer (SEA05) technical priorities. FY18 Pillars remain as requested in PRESBUD.

A. Mission Description and Budget Item Justification

This project has been established to support the NAVSEA Tech Authority with the coordination of design and development efforts for cross-platform applicability to result in more affordable, mission-capable, and interoperable surface ship forces including ships that are less expensive to build and operate with reduced manning, reduced support costs, and greater utilization of emerging technology.

NAVSEA Tech Authority efforts under Project 3161, known as the Cross Platform Systems Development (CPSD) Program transition directly to early-stage ship design for Ship Preliminary Design and Feasibility Studies and other Program Executive Office (PEO) ship design programs. While these efforts support concept exploration and mission needs assessment for potential future ship acquisition programs, they also develop cross-program technology solutions and associated technical authority products. They are not direct efforts for specific, authorized shipbuilding programs. This project is the only R&D effort that provides a coordinated, collaborative approach to the development of: cross-platform naval ship and weapon system design, as well as engineering capabilities in the areas of design tools, criteria, and methods. This project also provides innovative solutions for current Fleet issues involving Technical Authority, such as interoperability issues with new systems or platforms, or broad technology insertion topics.

In FY18, the CPSD program was rebaselined to account for a decreasing budget to the following functional areas:

CPSD 1.0 - Platform Concept Advanced Development

CPSD 2.0 - Platform Design and Certification Tools/Engineering and Tech Data Exchange Development

CPSD 3.0 - Ship Systems Engineering/Modular Ship Systems Development

CPSD 5.0 - High Speed Ships and Craft Engineering

CPSD 6.0 - Alternate Power Systems Engineering

CPSD 8.0 - Embedded Interoperability (I/O) Engineering

CPSD 9.0 - Mission Capability Systems Engineering

CPSD 13.0 - Cybersecurity

CPSD 14.0 - Future Surface Combatant Study

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In FY19, all CPSD Pillars have been rebaselined again to better address CNO and NAVSEA Chief Engineer (SEA05) technical priorities and shall be comprised of the following functional areas:						
CPSD A - Ship Technology Improvements CPSD B - Fleet Maintenance and Life Cycle Cost Reduction CPSD C - Additive and Advanced Manufacturing Technology CPSD D - Digital Framework/Electromagnetic Environment and Development CPSD E - Unmanned Systems CPSD F - Cybersecurity						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Platform Concept Advanced Development (CPSD 1.0) Articles:		0.158	0.000	0.000	0.000	0.000
Description: This effort directly supports the Navy's ability to understand risk and associated cost of surface and expeditionary warfare assets; Unmanned Surface Vehicle (USV) design and analysis.		-	-	-	-	-
FY 2018 Plans: N/A.						
OCO: N/A.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar will be rolled into pillar CPSD E - Unmanned Systems.						
Title: Platform Design and Certification Tools/Engineering and Tech Data Exchange (CPSD 2.0) Articles:		0.244	1.313	0.000	0.000	0.000
Description: This effort supports the development of validation tools to certify the safety and mission capability of platform concepts and subsequently ships; establishes the integrated NAVSEA suite; and advances design methods, validation tools, and manpower tools to aid in rapid total platform definition and assessment.		-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Develop additional analytical capabilities (i.e. tools to simulate various sea states and ship motions). Additionally, preliminary design specifications must be developed to establish material selection criteria. Support the development of validation tools to certify the safety and mission capability of platform concepts. This effort advances platform design methods, design validation tools, manpower tools and tools to aid in rapid total platform definition.						
OCO: N/A.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar has been transitioned into pillar CPSD A - Ship Technology Improvements.						
Title: Ship Systems Engineering /Modular Ship Systems Development (CPSD 3.0) Articles:		1.742	2.173	0.000	0.000	0.000
Description: This effort supports Ship system development with a focus on technology transition, modularity and ship system technology integration to support ongoing ship modernization.		-	-	-	-	-
FY 2018 Plans: Continue to analyze the logistical and engineering aspects of the application of 3D modeling and printing technology in metals and powders. Continue assessment of technology solutions for aluminum cracking.						
OCO: N/A.						
FY 2019 Base Plans:						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar has been transitioned into pillar CPSD C - Additive and Advanced Manufacturing Technology.						
Title: High Speed Ships and Craft Engineering (CPSD 5.0)	Articles: -	0.204	0.000	0.000	0.000	0.000
Description: This effort supports the development of concepts for future high speed ships that promise improved mission effectiveness in mobility, survivability and warfare mission areas.						
FY 2018 Plans: N/A.						
OCO: N/A.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar will be rolled into pillar CPSD A - Ship Technology Improvements.						
Title: Alternative Power Systems Engineering (CPSD 6.0)	Articles: -	0.158	0.500	0.000	0.000	0.000
Description: This effort investigates concepts for ships with alternative HM&E/power/propulsion systems evaluating effectiveness in mobility, survivability, hull, mechanical/electrical and in traditional and evolving warfare mission areas.						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Investigate trimaran ship component model data to support the Project Agreement with Japan. OCO: N/A.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar has been transitioned into pillar CPSD D - Digital Framework/ Electromagnetic Environment and Development.						
Title: Embedded Interoperability (I/O) Engineering (CPSD 8.0) Description: This effort establishes and executes a dedicated process for evaluating the interoperability performance of warfare systems early in the acquisition cycle, prior to certification. Embedded I/O ensures that fewer mission critical system failures degrade the ultimately fielded war fighting capability. Focus on emerging Open Architecture warfare systems, including LCS Class.	Articles: 0.084 - -	0.084	0.000	0.000	0.000	0.000
FY 2018 Plans: N/A. OCO: N/A.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans:						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar will be rolled into pillar CPSD B - Fleet Maintenance and Life Cycle Cost Reduction.						
Title: Mission Capability Systems Engineering (CPSD 9.0)	Articles:	0.368	1.500	0.000	0.000	0.000
Description: This effort supports the development of force-level systems engineering criteria and guidance at the Systems of Systems (SoS) and Family of Systems (FoS) level. This effort allows for the enhanced warfighter and system performance with reduced personnel costs with project costs savings.		-	-	-	-	-
FY 2018 Plans: Funds development of an overarching open architecture concept that couples hull, mechanical and electrical (HM&E) systems to develop a "system of systems". The concept of open architecture must be implemented in the design of the future surface fleet to ensure cross platform and multi-mission capability. The concept of modularity will allow the Navy to have greater flexibility which decreases program costs (do more with less). Validate required mission performance against fully functional and degraded array conditions.						
OCO: N/A.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar has been transitioned into pillar CPSD B - Fleet Maintenance and Life Cycle Cost Reduction.						
Title: Cybersecurity (CPSD 13.0)	Articles:	4.816	8.096	0.000	0.000	0.000
		-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Description: This supports the research, design, development and testing of cybersecurity solutions for shipboard Hull Mechanical and Electrical (HM&E) , Navigation Systems, Combat Systems, and other shipboard control systems. It also supports the development of specifications and standards for the cybersecurity of all Navy Control Systems (NCS).</p> <p>FY 2018 Plans: Develop, implement, and operate a whole ship system of systems cyber test bed (USS SECURE). There is urgent need to secure Navy control systems and there is also insufficient production ready applications available that meet Navy requirements. In order to have a common cybersecurity solution adopted, it is essential that the tools and testing capabilities be available quickly. The additional funds will significantly accelerate development of deployable capabilities.</p> <p>Continue to research, develop, and mature various cross-platform cybersecurity solutions including but not limited to: situational awareness tools, boundary defense capabilities, cyber security optimized network design, network reconnaissance and discovery, and operational indifference to malicious intent. Continue spiral development and test and evaluation of cybersecurity technologies in shipboard environment. Continue to mature capability for Destroyer Fleet and Carriers and expand capability to Amphibious Fleet. Continue development of specifications and standards for Cybersecurity of NCS.</p> <p>OCCO: N/A.</p> <p>FY 2019 Base Plans: N/A</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the work accomplished under this pillar has been transitioned into pillar CPSD F - Cybersecurity.</p>						
<p>Title: Future Surface Combatant Studies (CPSD 14.0)</p> <p>Articles:</p>		2.000	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: This effort will lay the analytic foundation for the development of the Future Surface Combatant (FSC) post Capabilities Based Assessment. Ships produced from this effort will fill critical gaps in the fleet in the 2030 timeframe created by the decommissioning of CG 47, DDG 51, and LCS 1/2 ships. Unmanned vehicle efforts will expand conops to decouple mission capability from manned force structure.						
FY 2018 Plans: The FSC studies project moves to PU 2196 in FY18.						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: N/A						
Title: Cybersecurity (CPSD F)	Articles:	0.000	0.000	16.739	0.000	16.739
Description: Description: This supports the research, design, development and testing of Cybersecurity solutions for shipboard Hull Mechanical and Electrical (HM&E), Navigation Systems, Combat Systems, and other shipboard control systems. It also supports the development of specifications and standards for the Cybersecurity of all Navy Control Systems (NCS). This pillar was created for FY19 and follow-on years and includes FY18 pillars CPSD 13.0.		-	-	-	-	-
FY 2018 Plans: N/A						
FY 2019 Base Plans: Efforts will concentrate on ensuring the stability and supportability of hardware and software to be deployed operationally. Long term ownership and maintenance of capabilities will be established. Since cybersecurity is a constantly evolving environment, efforts will continue to research, develop, and mature various cross-platform cybersecurity solutions including but not limited to: situational awareness tools, boundary defense capabilities, cyber security optimized network design, network reconnaissance and discovery, and operational						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
indifference to malicious intent. Continue development of specifications and standards for cybersecurity of NCS. Cybersecurity implementation will be expanded to additional classes of ships on a schedule to be determined based on availability.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 18 to FY19 (\$8.643M) between CPSD 13.0 (\$8.096 million) and CPSD F (\$16.739 million) to fund additional work to transition capabilities to a technology readiness level commensurate with deployment, such as testing, documentation, and ship change planning. Long term ownership and maintenance of capabilities will be established. Funding also provides the ability to back fit targeted capabilities for legacy/in service platforms; and allows for the update and management of deployed software/hardware. Funding will also accelerate the development of a distributed Cyber test capability that provides a system of systems cyber test and assessment capability and will provide cyber assessments of systems, systems-of-systems, platforms, strike groups and theater level missions.						
Title: Ship Technology Improvements (CPSD A) Description: This effort provides for the analysis of ship system technologies to reduce design and construction costs. This also includes the development of validation tools to certify the safety and mission capability of platform concepts and subsequently ships. FY 2018 Plans: N/A FY 2019 Base Plans: Continue the development of ship construction technology improvements to reduce risk related to alternative technical architectures and designs. Complete support of tri-maran hull configuration performance evaluation. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement:	Articles: - Articles: - Articles: - Articles: -	0.000	0.000	1.340	0.000	1.340

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
This pillar was created for FY19 and follow-on years and includes FY18 pillars CPSD 2.0 & 5.0 (\$1.313M in FY18). Minor funding increase by inflation adjustment, as selected tasking in FY19 is expected to be commensurate with FY18 tasking.						
Title: Fleet Maintenance and Life Cycle Cost Reduction (CPSD B)	Articles: -	0.000	0.000	1.150	0.000	1.150
Description: This effort funds the development of tools, analyses and technologies to reduce fleet life cycle costs, reduce life-cycle failure risk and improved refurbishment cycles. This will allow the Navy to better meet fleet operational and technical requirements and lower cost.						
FY 2018 Plans: N/A.						
FY 2019 Base Plans: Develop technologies to reduce in-service costs and technical risk associated with deployed technologies and systems. FY19 shall include a focus on technology improvements to reduce known in-service deficiencies.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: This pillar was created for FY19 and follow-on years and includes FY18 pillars CPSD 8.0 & 9.0 (\$1.5M in FY18). Minor funds decrease.						
Title: Additive and Advanced Manufacturing Technology (CPSD C)	Articles: -	0.000	0.000	7.360	0.000	7.360
Description: This effort funds the development of additive manufacturing technologies, advanced coating techniques, topology optimization and materials characterization and selection. This pillar was created for FY19 and follow-on years and includes FY18 pillars CPSD 3.0.						
FY 2018 Plans: N/A						
FY 2019 Base Plans: Funding transitioned from FY18 CPSD Pillar 3.0 will be utilized to analyze the logistical and engineering aspects of the application of 3D modeling and additive manufacturing (AM) technology for metal and polymer						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
components. Further conduct material characterization and selection efforts for both additively manufactured and conventional materials.						
Additional funding provided in FY19 will be used to accelerate CNO additive manufacturing priorities and aligns them with technical authority requirements and products. Solutions will provide the foundation to increase Fleet readiness and improve warfighting capacity by enabling production at or near the point of need. Specific efforts include development of AM design and manufacturing standards; determining AM equipment performance requirements in dynamic environments (I.e. shipboard); ship integration requirements for AM equipment; and navy-specific AM industrial base requirements including digital file transfer and cyber.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increase from FY18 to FY19 (+\$7.360 million) is attributed to the approval of CNO-directed initiative to expedite Additive Manufacturing benefit to the fleet as increased warfighter capability and improved readiness, in addition to transitioning requirements from FY18 CPSD Pillar 3.0 into Functional Area CPSD C.						
Title: Digital Framework/Electromagnetic Environment and Development (CPSD D) Description: Develop an understanding and address the energy demands of the future fleet including power management and energy harvesting.		Articles: 0.000 -	Articles: 0.000 -	Articles: 0.625 -	Articles: 0.000 -	Articles: 0.625 -
FY 2018 Plans: N/A						
FY 2019 Base Plans: Develop power management and distribution technologies. Complete ship display system testing.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: This pillar was created for FY19 and follow-on years and includes FY18 pillars CPSD 6.0 (\$0.500M in FY18).						
Title: Unmanned Systems (CPSD E) Description:		Articles: 0.000 -	Articles: 0.000 -	Articles: 0.603 -	Articles: 0.000 -	Articles: 0.603 -

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Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)						
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total								
Description: This effort funds the development and advancement of NAVY unmanned systems across various platforms. Note: Unmanned system efforts in years prior to FY19 were captured under CPSD Pillar 1.0.												
FY 2018 Plans: N/A												
FY 2019 Base Plans: Efforts focus on the development of rapid deployment and swarming technologies (and the deployment of such weapon systems). Swarming technologies require funding to provide weapon system alternatives for both large and small scale unmanned platforms. Perform evaluation of multi-scaled vehicles for deployment from various host vessels.												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: Minor increase for unmanned systems efforts.												
Accomplishments/Planned Programs Subtotals						9.774	13.582	27.817	0.000	27.817		
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• RDTEN/0204202N: DDG-1000	45.187	140.500	161.264	-	161.264	132.337	133.781	88.573	16.617	Continuing	Continuing	
• RDTEN/0603512N: Carrier Systems Development	7.516	9.296	5.440	-	5.440	5.401	5.531	5.637	5.778	Continuing	Continuing	
• RDTEN/0603564N: Ship Preliminary Design/Feasibility Studies	13.451	12.012	13.348	-	13.348	22.534	9.320	9.494	9.687	Continuing	Continuing	
• RDTEN/0604567N: Ship Contract Design/Live Fire T&E	82.946	67.166	60.062	-	60.062	59.688	54.596	55.677	56.859	Continuing	Continuing	
• RDTEN/0603582N: Combat System Integration	23.839	24.674	16.351	-	16.351	27.921	16.015	15.509	26.496	Continuing	Continuing	
Remarks												

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D. Acquisition Strategy This is a non-acquisition program that develops, evaluates, and validates early stages of total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for those concept designs and assessments. This program provides validated engineering tools, methods, and criteria for ship, and weapon system concept designs and assessments while fostering collaboration and coordination of efforts resulting in more effective use of funding.		
E. Performance Metrics Quarterly Program Reviews		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	Various Contractors : Various	18.436	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC, NUWC, CDSA : Various	62.829	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	DRS : Stevensville, MD	3.249	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC, NUWC : Various	53.465	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NSWC : Various	20.044	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	SPAWAR : Various	1.922	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test and Evaluation	WR	NSWC : Various	11.910	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC DD : Dahlgren, VA	0.200	0.200	May 2017	0.200	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC CD : Carderock, MD	0.800	1.480	Dec 2016	1.000	Dec 2017	1.050	Dec 2018	-		1.050	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC PL : Philadelphia, PA	0.874	0.874	May 2017	0.872	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NRL : Washington, D.C.	0.046	0.046	Aug 2017	0.046	Aug 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	ALION : Wahington, D.C.	0.120	0.120	May 2017	0.120	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	CSC : Washington, D.C.	0.300	0.300	Jul 2017	0.300	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	MIPR	Army Research Lab : Aberdeen Proving Ground, MD	0.075	0.075	Jul 2017	0.075	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	WR	NUWC Newport : Newport, RI	0.132	0.132	Dec 2016	0.382	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	WR	NUWC Keyport : Keyport, WA	0.150	0.150	Nov 2016	0.150	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 3161 / NAVSEA Tech Authority							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Development	WR	NSWC Crane : Crane, IN	0.169	0.169	Dec 2016	0.169	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC DD : Dahlgren, VA	0.425	0.425	May 2017	0.800	May 2018	0.500	Dec 2018	-		0.500	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC CD : Carderock, MD	1.324	0.265	Dec 2016	1.775	Dec 2017	1.278	Dec 2018	-		1.278	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC PD : Philadelphia, PA	0.244	0.244	Nov 2016	0.294	Nov 2017	0.500	Nov 2018	-		0.500	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	CSC : Washington, D.C.	0.100	0.100	Jul 2017	0.100	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	JHU APL : Baltimore, MD	0.200	0.200	May 2017	0.200	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NUWC Keyport : Keyport, WA	0.050	0.050	Mar 2017	0.050	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NSWC CD : Carderock, MD	0.250	0.250	Dec 2016	0.250	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NSWC PD : Philadelphia, PA	0.125	0.125	Dec 2016	0.125	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Cybersecurity Technologies	C/CPFF	JHU/APL : Baltimore, MD	1.585	1.583	May 2017	3.791	May 2018	1.500	May 2019	-		1.500	Continuing	Continuing	Continuing
Cybersecurity Technologies	C/CPFF	MITRE : McLean, VA	0.304	0.304	Oct 2016	0.500	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Cybersecurity Technologies	MIPR	PNNL DOE : Richland, WA	0.300	0.300	Jul 2017	0.300	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC CD : Carderock, MD	0.000	0.000		0.000		1.330	Oct 2018	-		1.330	0.000	1.330	-
Engineering Development	WR	NUWC Keyport : Keyport, WA	0.000	0.000		0.000		0.020	Oct 2018	-		0.020	0.000	0.020	-
Engineering Development	WR	PHD NSW : Port Hueneme, CA	0.030	0.030	May 2017	0.030	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	Various Contractors : Various	0.000	0.000		0.000		5.350	Oct 2018	-		5.350	0.000	5.350	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design						Project (Number/Name) 3161 / NAVSEA Tech Authority				

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Cybersecurity Technologies	WR	NUWC Keyport : Keyport, WA	0.000	0.000		0.000		0.350	Dec 2018	-		0.350	0.000	0.350	-
Cybersecurity Technologies	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		0.600	Dec 2018	-		0.600	0.000	0.600	-
Cybersecurity Technologies	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		0.350	Dec 2018	-		0.350	0.000	0.350	-
Cybersecurity Technologies	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		7.600	Dec 2018	-		7.600	0.000	7.600	-
Cybersecurity Technologies	WR	NSWC PD : Philadelphia, PA	0.000	0.000		0.000		2.100	Dec 2018	-		2.100	0.000	2.100	-
Subtotal		179.658	7.422		11.529		22.528		-	22.528	Continuing	Continuing	N/A		

Remarks

Product development cost growth identified for Engineering Development in FY19 is required to support CPSD efforts. Additive Manufacturing and traditional materials technology are high growth areas in FY19 that will provide increased Fleet readiness and improve warfighting capacity by enabling production at or near the point of need.

***Cybersecurity Technologies cost growth funds added for comprehensive set of cyber warfighting capabilities to meet existing Fleet cybersecurity gaps, added distributed cyber test capability, cyber test and assessment capability and cybersecurity T&E policy, directives and requirements. Funding moved from engineering development and systems engineering categories to better define cyber-specific funding allocations.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NUWC Newport : Newport, RI	0.100	0.100	Dec 2016	0.100	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC DD : Dahlgren, VA	0.100	0.100	Mar 2017	0.100	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC CD : Carderock, MD	0.250	0.250	Dec 2016	0.250	Dec 2017	0.500	Dec 2018	-		0.500	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC PD : Philadelphia, PA	0.125	0.125	Oct 2016	0.175	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	G2OPS : Virginia Beach, VA	0.250	0.250	Mar 2017	0.250	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 3161 / NAVSEA Tech Authority							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	JHU/APL : Baltimore, MD	0.100	0.100	May 2017	0.100	May 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Cybersecurity Technologies	WR	NSWC CD : Carderock, MD	0.000	0.000		0.000		1.489	Dec 2018	-		1.489	0.000	1.489	-
Cybersecurity Technologies	MIPR	SPAWAR : Various	0.000	0.000		0.000		0.250	Dec 2018	-		0.250	0.000	0.250	-
Cybersecurity Technologies	C/CPFF	Various Contractors : Various	0.000	0.000		0.000		1.500	Jan 2019	-		1.500	0.000	1.500	-
Subtotal		0.925	0.925		0.975		3.739		-		-	3.739	Continuing	Continuing	N/A

Remarks

Cybersecurity Technologies cost growth funds added for comprehensive set of cyber warfighting capabilities to meet existing Fleet cybersecurity gaps, added distributed cyber test capability, cyber test and assessment capability and cybersecurity T&E policy, directives and requirements. Funding moved from engineering development and systems engineering categories to better define cyber-specific funding allocations. Funding moved from engineering development and systems engineering categories to better define cyber-specific funding allocations.

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Planning & Execution	WR	NSWC DD : Dahlgren, VA	0.020	0.020	Dec 2016	0.020	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Cybersecurity Technologies	WR	NSWC CD : Carderock, MD	0.450	0.250	Dec 2016	0.250	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Cybersecurity Technologies	C/CPFF	JHU/APL : Baltimore, MD	0.100	0.450	May 2017	0.100	May 2018	0.500	May 2019	-		0.500	Continuing	Continuing	Continuing
Subtotal		0.570	0.720		0.370		0.500		-		-	0.500	Continuing	Continuing	N/A

Remarks

Cost growth at JHU/APL for T&E is due the acceleration of a distributed Cyber test capability.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 3161 / NAVSEA Tech Authority							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PM/Travel	Allot	NAVSEA HQ : Washington, DC	0.700	0.049	Dec 2016	0.050	Dec 2017	0.050	Dec 2018	-		0.050	Continuing	Continuing	Continuing
DAWDF	Various	Not Specified : Not Specified	0.145	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Mgmt Spt	WR	NUWC Newport : Newport, RI	0.032	0.032	Dec 2016	0.032	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Mgmt Spt	WR	NSWC DD : Dahlgren, VA	0.100	0.100	Dec 2016	0.100	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Mgmt Spt	WR	NSWC CD : Carderock, MD	0.250	0.250	Nov 2016	0.250	Nov 2017	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Program Mgmt Spt	C/CPFF	CSC : Washington, D.C.	0.105	0.105	Jul 2017	0.105	Jul 2018	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Program Mgmt Spt	C/FFP	ARDEC : Picatinny Arsenal, NJ	0.100	0.100	Jun 2017	0.100	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Mgmt Spt	MIPR	PNNL DOE : Richland, WA	0.071	0.071	Jul 2017	0.071	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Cybersecurity Technologies	C/CPFF	CSC : Washington, D.C.	0.000	0.000		0.000		0.250	Dec 2018	-		0.250	0.000	0.250	-
Cybersecurity Technologies	C/CPFF	Alion : Washington, D.C.	0.000	0.000		0.000		0.250	Dec 2018	-		0.250	0.000	0.250	-
Subtotal		1.503	0.707		0.708		1.050		-			1.050	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			182.656	9.774		13.582		27.817		-		27.817	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

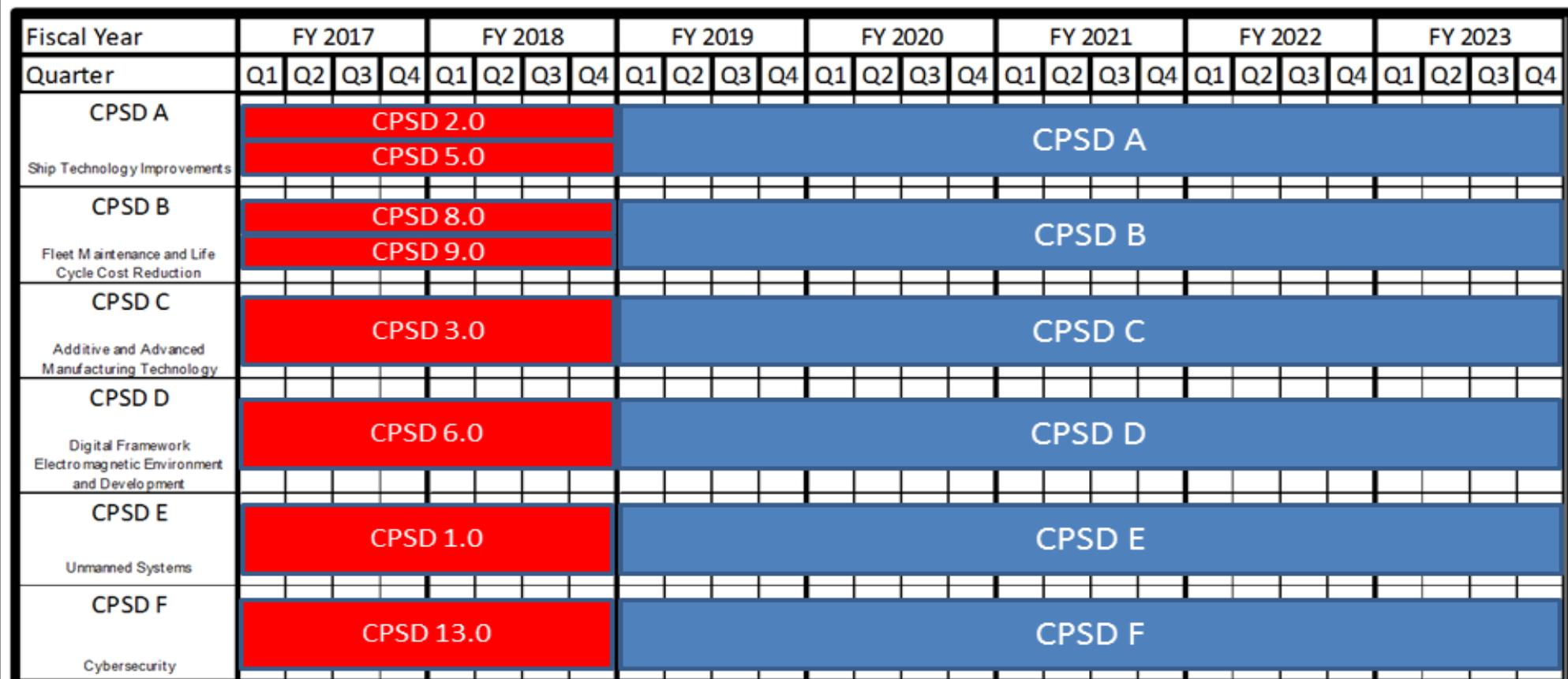
1319 / 4

R-1 Program Element (Number/Name)

PE 0603563N / Ship Concept Advanced Design

Project (Number/Name)

3161 / NAVSEA Tech Authority



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>	Project (Number/Name) 3161 / <i>NAVSEA Tech Authority</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3161				
Platform Concept Advanced Development	1	2017	4	2018
Ship Systems Engineering/Modular Ship Systems Development (PNA)	1	2017	4	2018
Alternative HM&E Systems Engineering	1	2017	4	2018
Mission Capability Affordability and Sustainment	1	2017	4	2018
Cybersecurity Technologies	1	2017	4	2018
Future Surface Combatant Study	1	2017	4	2018
High Speed Ships and Craft Engineering (HFP)	1	2017	4	2018
Embedded Interoperability Engineering	1	2017	4	2018
Platform Design and Certification Tools/Engineering and Tech Data Exchange Development	1	2017	4	2018
Future Surface Combatant Studies	1	2017	4	2017
CPSD A - Ship Technology Improvements	1	2019	4	2023
CPSD B - Fleet Maintenance and Life Cycle Cost Reduction	1	2019	4	2023
CPSD C - Additive and Advanced Manufacturing Technology	1	2019	4	2023
CPSD D - Digital Framework/Electromagnetic Environment and Development	1	2019	4	2023
CPSD E - Unmanned Systems	1	2019	4	2023
CPSD F - Cybersecurity	1	2019	1	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 3376 / Strategic Sealift				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3376: Strategic Sealift	5.593	4.153	0.000	6.335	-	6.335	6.004	6.127	6.250	6.377	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Project 3376 - Strategic Sealift Research and Development - Develops new concepts and technologies which can be applied to or will enable future strategic sealift, and Seabasing systems. The technologies include ship configuration concepts, equipment to increase cargo handling and cargo loading/unloading rates (including commercial and merchant ship systems), improved man/machine interfaces, improved structural configurations and materials, and Logistics-Over-the-Shore (LOTS) equipment and system improvements.

Note: FY2018, FY2016 and prior year efforts were financed under the National Sealift Defense Fund (NDSF) BA 04, Project 3116 (Strategic Sealift Research and Development). FY2017 and FY2019-FY2023 efforts are financed under this program element.

FY 18 NDSF BA 04 Project 3116 amount: \$6.425 million

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Shipboard Crane Systems/Shipboard Cargo Systems Articles:	1.311	0.000	3.800	0.000	3.800
FY 2018 Plans: FY2018 efforts are being funded under the National Defense Sealift Fund (NDSF) BA 04, Project 3116 (Strategic Sealift Research and Development). FY18 = \$2.925M	-	-	-	-	-
FY 2019 Base Plans: Continue investigation and demonstration of shipboard crane/cargo system improvements including weapons handling and transfer capabilities.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: National Defense Sealift Fund (NDSF) disestablished transferring funds into RDTEN. Minor increase (+\$875K) from FY18 (\$2.925M). The increase in the Shipboard Crane category is due to efforts related to Vertical Launch System rearming and MPS fleet crane enhancement. The plan during FY19 is to implement and conduct					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design	Project (Number/Name) 3376 / Strategic Sealift				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
shipboard demonstrations of systems, technologies, and procedures developed during FY18 for VLS rearming and to conduct a shipboard installation and underway test of upgraded crane controls on USNS Piliiau.						
Title: Sealift Concept Development FY 2018 Plans: FY2018 efforts are being funded under the National Defense Sealift Fund (NDSF) BA 04, Project 3116 (Strategic Sealift Research and Development). FY18 = \$1.900M	Articles: - FY 2019 Base Plans: Continue providing Sealift Research and Technology development and program guidance. Conduct Sealift ship concept development and analysis. FY 2019 OCO Plans: N/A	1.842	0.000	0.750	0.000	0.750
FY 2018 to FY 2019 Increase/Decrease Statement: National Defense Sealift Fund (NDSF) disestablished transferring funds into RDTEN. Minor decrease from FY2018 (-\$1.150M).						
Title: Lighter/HSV Seabase to Shore Cargo Transfer FY 2018 Plans: FY2018 efforts are being funded under the National Defense Sealift Fund (NDSF) BA 04, Project 3116 (Strategic Sealift Research and Development). FY18 = \$1.600M	Articles: - FY 2019 Base Plans: Continue development and demonstration of at-sea vehicle transfer capability. FY 2019 OCO Plans: N/A	1.000	0.000	0.385	0.000	0.385
FY 2018 to FY 2019 Increase/Decrease Statement: National Defense Sealift Fund (NDSF) disestablished transferring funds into RDTEN. Minor decrease from FY2018 (-\$1.215M).						
Title: Advanced Tools		0.000	0.000	1.400	0.000	1.400

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018							
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design			Project (Number/Name) 3376 / Strategic Sealift												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
FY 2018 Plans: FY2018 efforts are being funded under the National Defense Sealift Fund (NDSF) BA 04, Project 3116 (Strategic Sealift Research and Development). No funding for this subproject effort in PB18 budget.										Articles:	-	-	-	-			
FY 2019 Base Plans: Continue investigation and demonstration of individual and multiship motion measurement and prediction.																	
FY 2019 OCO Plans: N/A																	
FY 2018 to FY 2019 Increase/Decrease Statement: National Defense Sealift Fund (NDSF) disestablished transferring funds into RDTEEN.																	
The increase (+\$1.400M) of the Advanced Tools effort reflects a planned increase in prototype development and shipboard installation efforts for individual and multiship motion measurement and prediction technology. The result of this increased effort is to allow the technology to be evaluated and matured based on performance in an operational environment on a variety of vessel types.																	
Accomplishments/Planned Programs Subtotals										4.153	0.000	6.335	0.000	6.335			
C. Other Program Funding Summary (\$ in Millions)											Cost To Complete						
Line Item	FY 2017	FY 2018	FY 2019	Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete	Total Cost					
• NDSF/0900 (3116): Strategic Sealift Research and Development	0.000	6.425	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.256					
Remarks																	
D. Acquisition Strategy																	
Not applicable for SEALIFT R&D efforts.																	
E. Performance Metrics																	
Annual Program Review.																	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design				Project (Number/Name) 3376 / Strategic Sealift								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Shipboard Crane Systems/ Shipboard Cargo Systems	WR	Various Contractors : Various	1.250	1.311	Jan 2017	0.000		3.800	Jan 2019	-		3.800	Continuing	Continuing	Continuing	
Sealift Concept Development	WR	Various Contractors : Various	1.283	1.842	Jan 2017	0.000		0.750	Jan 2019	-		0.750	Continuing	Continuing	Continuing	
Lighter/HSV Seabase to Shore Cargo Transfer	WR	Various Contractors : Various	3.060	1.000	Jan 2017	0.000		0.385	Jan 2019	-		0.385	Continuing	Continuing	Continuing	
Advance Tools	WR	Various : Various	0.000	0.000		0.000		1.400	Jan 2019	-		1.400	Continuing	Continuing	Continuing	
Subtotal		5.593	4.153		0.000		6.335			-		6.335	Continuing	Continuing	N/A	
Remarks				1. FY2018, FY2016 and prior years (FY14 and earlier) were funded under NDSF BA 04 Project 3116 Strategic Sealift Research and Development. 2. Award dates reflect initial date of incremental funding execution.												
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				5.593	4.153		0.000		6.335		-		6.335	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603563N / Ship Concept Advanced Design

Project (Number/Name)

3376 / Strategic Sealift

Exhibit R-4, RDT&E Schedule Profile: PB 19 Navy

Date: January 2018

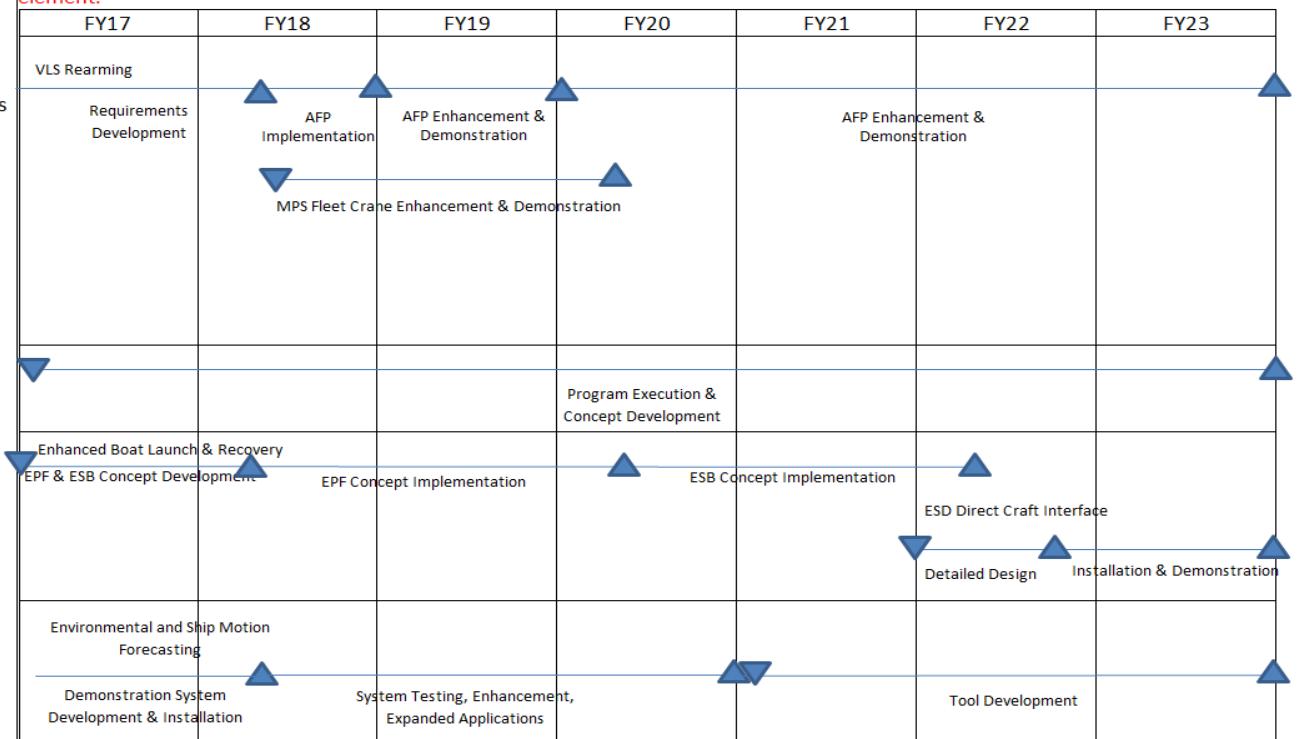
Appropriation/Budget Activity
4557 / 04

R-1 Program Element (Number/Name)
PE 0603563N, Ship Concept Advanced Design

Project (Number/Name)
Project 3376 Strategic Sealift

Shipboard Crane Systems/Shipboard Cargo Systems

Note: FY2018, FY2016 and prior year (FY14 and earlier) efforts were financed under the National Sealift Defense Fund (NDSF) BA 04, Project 3116 (Strategic Sealift Research and Development. FY 2017, FY2019 and out-year funds are financed under this program element.



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design	Project (Number/Name) 3376 / Strategic Sealift		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 3376</i>				
Shipboard Crane Systems/Shipboard Cargo Systems		1	2017	4
Sealift Concept Development		1	2017	4
Lighter/HSV Seabase to Shore Cargo Transfer		1	2017	4
Advanced Tools		1	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)						
1319 / 4					PE 0603563N / Ship Concept Advanced Design				4037 / Common Hull Auxiliary Multi-Mission Platform (CHAMP)						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
4037: Common Hull Auxiliary Multi-Mission Platform (CHAMP)	0.000	0.000	0.000	18.000	-	18.000	8.000	8.000	0.000	0.000	0.000	34.000			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-				
A. Mission Description and Budget Item Justification															
Note: This program is a new start in FY19.															
The Common Hull Auxiliary Multi-mission Platform (CHAMP) concept leverages a new approach to requirements generation and shipbuilding to replace aging mission specific designs with a common hull to reduce life cycle costs, leverage tailored payloads, and stabilize the industrial base. Identified CHAMP missions include: Sealift, Aviation Intermediate Maintenance support, Medical Services, Command & Control, and Submarine Tending. FY 2019 funding supports Industry Studies to inform requirements definition, provide early industry engagement and follow-on assessment across CHAMP mission functionality.															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: CHAMP Design and Total Ship Integration											0.000	0.000	18.000	0.000	18.000
FY 2018 Plans: N/A											Articles:	-	-	-	-
FY 2019 Base Plans: CHAMP Design and Total Ship Integration - Issue Industry Studies RFP, conduct source selection and award Industry Studies contracts. Industry Studies will include trade studies and analysis on main machinery, reconfigurable system arrangements, and ship and reconfigurable system interfaces. Develop and initiate initial acquisition planning documents. Coordinate with NAVSEA, MSC, PEO Ships, CNO, ASN RD&A, OSD and Fleet.															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: New program to support integrated concept ship design, requirements definition for the CHAMP program. Funds added to start early industry studies for a replacement to several ship classes.															
Accomplishments/Planned Programs Subtotals											0.000	0.000	18.000	0.000	18.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / <i>Ship Concept Advanced Design</i>	Project (Number/Name) 4037 / <i>Common Hull Auxiliary Multi-Mission Platform (CHAMP)</i>
C. Other Program Funding Summary (\$ in Millions)		
N/A		
Remarks		
D. Acquisition Strategy Develop and issue Industry Studies RFP for award of multiple contracts in FY19 to participate in trade studies and analysis on main machinery, reconfigurable system arrangements, and ship and reconfigurable system interfaces. Based on the results of the tradeoffs, develop integrated design and inform Government requirements definition for future ship acquisition.		
E. Performance Metrics None.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design						Project (Number/Name) 4037 / Common Hull Auxiliary Multi-Mission Platform (CHAMP)					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Design Trade-off Tool & Design Studies	WR	NSWC : MD	0.000	0.000		0.000		1.000	Nov 2018	-		1.000	1.000	2.000	-
Industry Studies	C/FFP	Various : Various	0.000	0.000		0.000		13.000	Jul 2019	-		13.000	3.000	16.000	-
Engineering Support	Various	Various : Various	0.000	0.000		0.000		3.000	Nov 2018	-		3.000	3.500	6.500	-
Subtotal			0.000	0.000		0.000		17.000		-		17.000	7.500	24.500	N/A
Remarks Funds new program to start early industry studies for a replacement to several ship classes for CHAMP Design and Total Ship Integration efforts.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
RFP & Program Documentation Development	Various	Various : Various	0.000	0.000		0.000		1.000	Nov 2018	-		1.000	0.500	1.500	-
Subtotal			0.000	0.000		0.000		1.000		-		1.000	0.500	1.500	N/A
Remarks Funds new program to start early industry studies for a replacement to several ship classes for CHAMP Design and Total Ship Integration efforts.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		18.000		-		18.000	8.000	26.000	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

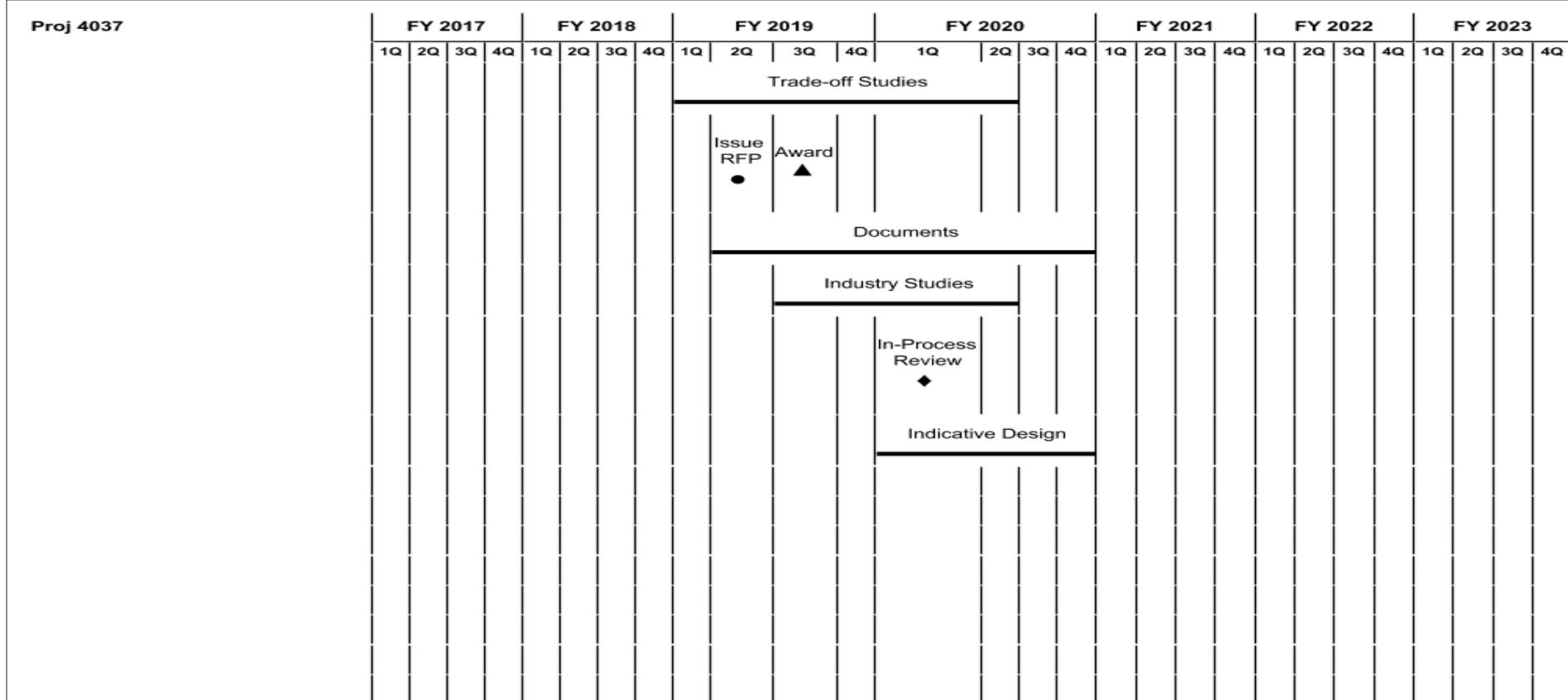
1319 / 4

R-1 Program Element (Number/Name)

PE 0603563N / Ship Concept Advanced Design

Project (Number/Name)

4037 / Common Hull Auxiliary Multi-Mission Platform (CHAMP)



2019PB - 0603563N - 4037

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603563N / Ship Concept Advanced Design	Project (Number/Name) 4037 / Common Hull Auxiliary Multi-Mission Platform (CHAMP)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4037				
Design Trade-off Tool & Design Studies	1	2019	2	2020
Issue Industry Studies Request for Proposal	2	2019	2	2019
Industry Studies Award	3	2019	3	2019
Program Documentaion Development	2	2019	4	2020
Industry Studies	3	2019	2	2020
In-Process Review	1	2020	1	2020
Indicative Design Development	1	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603564N / Ship Prel Design & Feasibility Studies								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	3.646	13.451	12.012	13.348	-	13.348	22.534	9.320	9.494	9.687	Continuing	Continuing	
3261: TAGOS Design & Total Ship Integration	0.000	0.000	12.012	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.012	
3377: T-ATS Ship Concept Development	3.646	0.941	0.000	0.393	-	0.393	0.393	0.000	0.000	0.000	0.000	5.373	
3389: OPLOG IPT Development	0.000	12.510	0.000	12.955	-	12.955	22.141	9.320	9.494	9.687	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$.139 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.													
3261 - T-AGOS Design & Total Ship Integration - Ocean surveillance ships gather underwater acoustical data to support the mission of the Integrated Undersea Surveillance System by providing a ship platform capable of theater anti-submarine acoustic passive and active surveillance. Auxiliary General Ocean Surveillance Ships (T-AGOS) are operated by Military Sealift Command to support the anti-submarine warfare mission of the commanders of the Atlantic and Pacific Fleets. The two current classes of surveillance ships use surveillance towed-array sensor system (SURTASS) equipment to gather undersea acoustic data. The ships also carry electronic equipment to process and transmit that data via satellite to shore stations for evaluation. Funding will support recapitalization of the four SWATH (T-19 Class) and one SWATH (T-23 Class) Auxiliary General Ocean Surveillance ships (T-AGOS). Funding for FY19 to FY23 was transferred to PE 0204313N (Ship-Towed Array Surveillance Systems).													
3377 - The Navy requires ocean-going towing, salvage, and rescue capabilities to support Fleet operations. The Navy's current capabilities are provided by four T-ATF 166 class Fleet Tugs and four T-ARS 50 class Salvage ships which reach the end of their expected service lives starting in 2020 and 2025, respectively. The T-ATF Fleet Tugs perform towing at sea, salvage, and diving operations; act as a support ship for portable deep-diving equipment and submarine rescue operations; provide fire-fighting assistance; and perform oil spill pollution abatement. The T-ARS Salvage Ships perform combat salvage, lifting, emergency repair, and rescue towing of combatant or support ships damaged, stranded, scuttled, distressed, or abandoned at sea to repair yards or safe havens. The T-ATS program will recapitalize the current Fleet Tugs and Salvage Ships with a common hull Towing, Salvage and Rescue Ship (T-ATS) that is capable of performing the missions of the retiring T-ATF and T-ARS classes.													
3389 - Naval Operational Logistics (OPLOG) Integration IPT Development - Develops enabling technologies for future and in-service afloat operational logistics and integrated supply force and combatant logistics requirements; and conducts cooperative initiatives with acquisition programs, program sponsors, engineering managers, the Navy science and technology community and Fleet customers. OPLOG develops integrated, cross-platform (i.e. applicable to more than one ship class/type)													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018																																																																																				
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603564N / <i>Ship Prel Design & Feasibility Studies</i>																																																																																				
operational logistics and energy conservation technologies and capabilities as well as draft acquisition and operations policy ensuring future Naval systems leverage emerging logistic capabilities and technologies to provide operationally effective and energy efficient logistics delivery.																																																																																					
B. Program Change Summary (\$ in Millions)	FY 2017 FY 2018 FY 2019 Base FY 2019 OCO FY 2019 Total																																																																																				
<table> <tr> <td>Previous President's Budget</td><td>15.805</td><td>12.012</td><td>18.990</td><td>-</td><td>18.990</td></tr> <tr> <td>Current President's Budget</td><td>13.451</td><td>12.012</td><td>13.348</td><td>-</td><td>13.348</td></tr> <tr> <td>Total Adjustments</td><td>-2.354</td><td>0.000</td><td>-5.642</td><td>-</td><td>-5.642</td></tr> <tr> <td> • Congressional General Reductions</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Directed Reductions</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Rescissions</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Adds</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Congressional Directed Transfers</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • Reprogrammings</td><td>-</td><td>-</td><td></td><td></td><td></td></tr> <tr> <td> • SBIR/STTR Transfer</td><td>-0.354</td><td>0.000</td><td></td><td></td><td></td></tr> <tr> <td> • Program Adjustments</td><td>0.000</td><td>0.000</td><td>-5.611</td><td>-</td><td>-5.611</td></tr> <tr> <td> • Rate/Misc Adjustments</td><td>0.000</td><td>0.000</td><td>-0.031</td><td>-</td><td>-0.031</td></tr> <tr> <td> • Congressional Directed Reductions</td><td>-2.000</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr> <td>Adjustments</td><td></td><td></td><td></td><td></td><td></td></tr> </table>		Previous President's Budget	15.805	12.012	18.990	-	18.990	Current President's Budget	13.451	12.012	13.348	-	13.348	Total Adjustments	-2.354	0.000	-5.642	-	-5.642	• Congressional General Reductions	-	-				• Congressional Directed Reductions	-	-				• Congressional Rescissions	-	-				• Congressional Adds	-	-				• Congressional Directed Transfers	-	-				• Reprogrammings	-	-				• SBIR/STTR Transfer	-0.354	0.000				• Program Adjustments	0.000	0.000	-5.611	-	-5.611	• Rate/Misc Adjustments	0.000	0.000	-0.031	-	-0.031	• Congressional Directed Reductions	-2.000	-	-	-	-	Adjustments					
Previous President's Budget	15.805	12.012	18.990	-	18.990																																																																																
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Total Adjustments	-2.354	0.000	-5.642	-	-5.642																																																																																
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• Congressional Directed Reductions	-2.000	-	-	-	-																																																																																
Adjustments																																																																																					
Change Summary Explanation																																																																																					
FY 19 changes include:																																																																																					
<ol style="list-style-type: none"> 1. FY19 reduction in T-AGOS (Project 3261) due to transfer to new PE 0204313N (Ship-Towed Array Surveillance Systems) 2. Increase in OPLOGINT (Project 3389) due to transfer from NDSF and adding funding for the development of a Robust Expeditionary Fuel System. 																																																																																					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies				Project (Number/Name) 3261 / TAGOS Design & Total Ship Integration			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3261: TAGOS Design & Total Ship Integration	0.000	0.000	12.012	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.012
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note
Funding for FY19 to FY23 was transferred to PE 0204313N.

A. Mission Description and Budget Item Justification
T-AGOS Design & Total Ship Integration - Ocean surveillance ships gather underwater acoustical data to support the mission of the Integrated Undersea Surveillance System by providing a ship platform capable of theater anti-submarine acoustic passive and active surveillance. Auxiliary General Ocean Surveillance Ships (T-AGOS) are operated by Military Sealift Command to support the anti-submarine warfare mission of the commanders of the Atlantic and Pacific Fleets. The two current classes of surveillance ships use surveillance towed-array sensor system (SURTASS) equipment to gather undersea acoustic data. The ships also carry electronic equipment to process and transmit that data via satellite to shore stations for evaluation. Funding will support recapitalization of the four SWATH (T-19 Class) and one SWATH (T-23 Class) Auxiliary General Ocean Surveillance ships (T-AGOS).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: T-AGOS Design & Total Ship Integration Articles:	0.000	12.012	0.000	0.000	0.000
FY 2018 Plans: Prepare and initiate staffing and approval for initial acquisition planning documents. Conduct Gate 2 to initiate development of the Capability Development Document (CDD). Conduct trade studies to support the development of a Pre-preliminary Design. Develop SURTASS interface documentation. Develop Request for Proposal (RFP) for Industry Studies to support the Navy led Preliminary Design. Prepare Milestone A Documentation. Coordinate acquisition efforts with NAVSEA, MSC, PEO SHIPS, CNO, ASN RD&A, OSD, and Fleet.	-	-	-	-	-
FY 2019 Base Plans: Funding for FY19 to FY23 was transferred to PE 0204313N.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603564N / <i>Ship Prel Design & Feasibility Studies</i>						Project (Number/Name) 3261 / <i>TAGOS Design & Total Ship Integration</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
P/U 3261's Funding for FY19 to FY23 was transferred to PE 0204313N.											
Accomplishments/Planned Programs Subtotals						0.000	12.012	0.000	0.000	0.000	
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• SCN/5030: <i>T-AGOS Surtass Ships</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	343.244	369.000	901.000	1,613.244
Remarks											
D. Acquisition Strategy Develop CDD, conduct trade studies and Pre-Preliminary Design in FY18. Issue RFP for Industry Studies for award of multiple contracts in FY19 to participate in Navy-led Preliminary/Contract Design (PD/CD) efforts. Complete Navy-led PD/CD efforts in FY21 in order to issue Detail Design and Construction (DD&C) RFP and award to a single shipbuilder in FY22 for DD&C of a Lead Ship with options for up to four follow-on ships.											
E. Performance Metrics None.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies				Project (Number/Name) 3261 / TAGOS Design & Total Ship Integration							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Integration/Design	Various	Various : Various	0.000	0.000		4.613	Feb 2018	0.000		-		0.000	0.000	4.613	-
Model Testing	Various	Various : Various	0.000	0.000		1.162	Jun 2018	0.000		-		0.000	0.000	1.162	-
SURTASS Integration	Various	various : various	0.000	0.000		2.000	Feb 2018	0.000		-		0.000	0.000	2.000	-
Subtotal			0.000	0.000		7.775		0.000		-		0.000	0.000	7.775	N/A
Remarks															
Funding for FY19 to FY23 was transferred to PE 0204313N.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MS documentation prep & RFP Development	Various	Various : Various	0.000	0.000		1.300	Feb 2018	0.000		-		0.000	0.000	1.300	-
Specification & TDP Development	Various	Various : Various	0.000	0.000		1.537	Feb 2018	0.000		-		0.000	0.000	1.537	-
Systems Integration (C4I/ Safety/Risk)	Various	Various : Various	0.000	0.000		1.000	Feb 2018	0.000		-		0.000	0.000	1.000	-
Subtotal			0.000	0.000		3.837		0.000		-		0.000	0.000	3.837	N/A
Remarks															
Funding for FY19 to FY23 was transferred to PE 0204313N.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation Planning	Various	Various : Various	0.000	0.000		0.400	Feb 2018	0.000		-		0.000	0.000	0.400	-
Subtotal			0.000	0.000		0.400		0.000		-		0.000	0.000	0.400	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies						Project (Number/Name) 3261 / TAGOS Design & Total Ship Integration			
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks Funding for FY19 to FY23 was transferred to PE 0204313N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		12.012		0.000		-		0.000	0.000	12.012	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

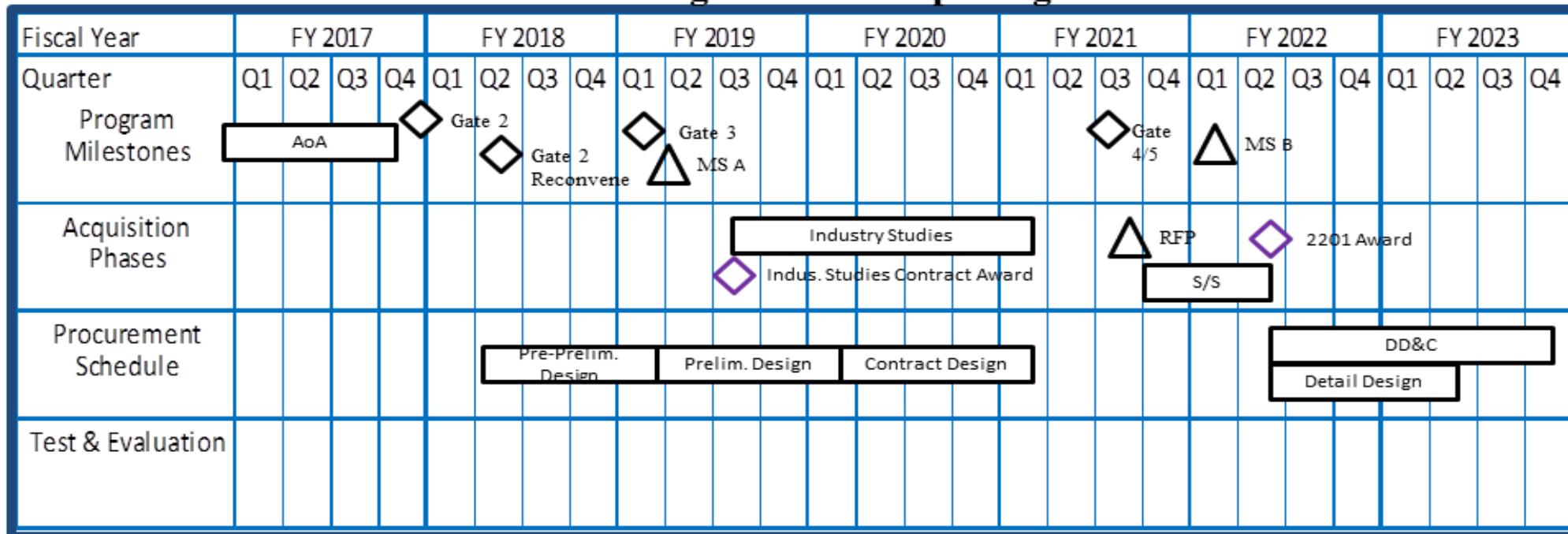
R-1 Program Element (Number/Name)

PE 0603564N / Ship Prel Design &
Feasibility Studies

Project (Number/Name)

3261 / TAGOS Design & Total Ship
Integration

T-AGOS Design & Total Ship Integration



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies	Project (Number/Name) 3261 / TAGOS Design & Total Ship Integration	
Schedule Details			
Events by Sub Project		Start	End
		Quarter	Year
<i>Proj 3261</i>		Quarter	Year
Gate 3		1	2019
Milestone B		1	2022
DD&C Award		2	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603564N / Ship Prel Design & Feasibility Studies				3377 / T-ATS Ship Concept Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3377: T-ATS Ship Concept Development	3.646	0.941	0.000	0.393	-	0.393	0.393	0.000	0.000	0.000	0.000	5.373
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
T-ATS Design - Recapitalizes the existing T-ATF 166 Fleet Tug and T-ARS 50 Salvage Ship Classes with a common hull Towing, Salvage and Rescue Ship (T-ATS) to support Fleet operations. The T-ATF Fleet Tugs perform towing at sea, salvage, and diving operations; act as a support ship for portable deep-diving equipment and submarine rescue operations; provide fire-fighting assistance; and perform oil spill pollution abatement. The T-ARS Salvage Ships perform combat salvage, lifting, emergency repair, and rescue towing of combatant or support ships damaged, stranded, scuttled, distressed, or abandoned at sea to repair yards or safe havens. Funding supports Ship Concept Development and Test & Evaluation (T&E) for future tug, salvage, and rescue mission capabilities.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
Title: Ship Concept Development						Articles:						
Description: Ship Concept Development and Test & Evaluation (T&E) for future tug, salvage, and rescue mission capabilities.												
FY 2018 Plans: N/A												
FY 2019 Base Plans: Support the execution of Test and Evaluation Phase Developmental Test (DT) schedule per the Test and Evaluation Master Plan (TEMP). Coordinate efforts with NAVSEA, Military Sealift Command (MSC), PEO Ships, Operational Test and Evaluation Force (OPTEVFOR) , Joint Interoperability Test Command (JITC) and OSD Director of Operational Test & Evaluation (ODT&E).												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: FY19 increase in P/U 3377 is due to T&E, which typically starts 1-2 years after contract award.												
Accomplishments/Planned Programs Subtotals						0.941 0.000 0.393 0.000 0.393						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity			R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4			PE 0603564N / Ship Prel Design & Feasibility Studies				3377 / T-ATS Ship Concept Development				
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SCN/5035: Towing, Salvage and Rescue Ship (T-ATS)	0.000	76.204	80.517	-	80.517	153.248	74.376	75.053	76.597	22.884	633.879
Remarks											
D. Acquisition Strategy											
Contract will be awarded February 2018.											
E. Performance Metrics											
None.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies				Project (Number/Name) 3377 / T-ATS Ship Concept Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	Various	NAVAIR/NSWC/ SPAWAR : MD, MD, SC	0.200	0.569	Aug 2017	0.000		0.000		-		0.000	0.000	0.769	-
Industry Design Studies	Various	Various : Various	0.679	0.000	Aug 2017	0.000		0.000		-		0.000	0.000	0.679	-
Subtotal			0.879	0.569		0.000		0.000		-		0.000	0.000	1.448	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Milestone Documentation Support	C/FFP	CSRA : DC	1.917	0.124	Aug 2017	0.000		0.000		-		0.000	0.000	2.041	-
RFP and Specification Development	Various	Alion/CSRA/ SPAWAR : DC, DC, SC	0.560	0.148	Aug 2017	0.000		0.000		-		0.000	0.000	0.708	-
Test & Evaluation Planning	Various	OPTEVFOR, CSC, ALION : VA, DC	0.290	0.100	Aug 2017	0.000		0.000		-		0.000	0.000	0.390	-
Subtotal			2.767	0.372		0.000		0.000		-		0.000	0.000	3.139	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Test & Evaluation	C/FFP	COMOPTEVFOR : VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Development Test & Evaluation	C/FFP	Various : Various	0.000	0.000		0.000		0.393	Mar 2019	-		0.393	0.393	0.786	-
Subtotal			0.000	0.000		0.000		0.393		-		0.393	0.393	0.786	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies				Project (Number/Name) 3377 / T-ATS Ship Concept Development					
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.646	0.941		0.000		0.393		-	0.393	0.393	5.373	N/A
<u>Remarks</u>												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

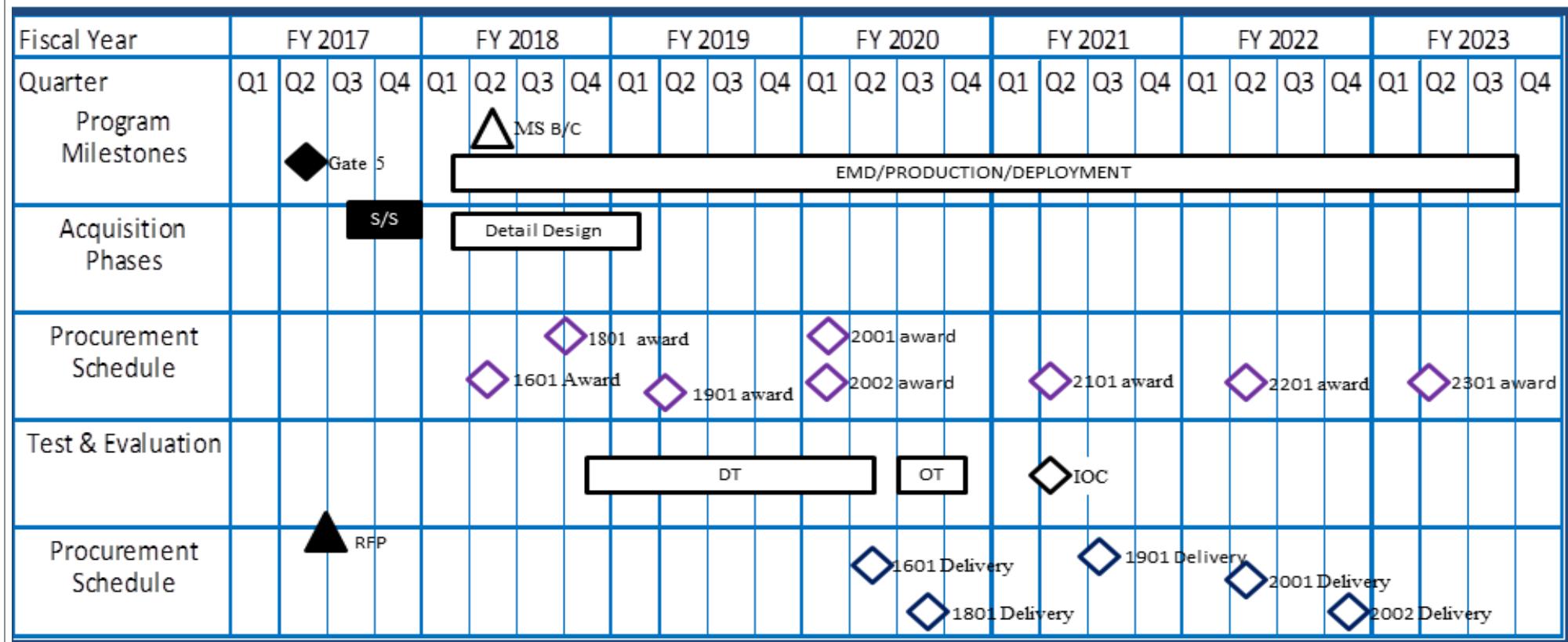
1319 / 4

R-1 Program Element (Number/Name)

PE 0603564N / Ship Prel Design &
Feasibility Studies

Project (Number/Name)

3377 / T-ATS Ship Concept Development

T-ATS Design & Total Ship Integration

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603564N / <i>Ship Prel Design & Feasibility Studies</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3377				
MILESTONE B/C	2	2018	2	2018
DT/OT	4	2018	4	2020
IOC	2	2021	2	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603564N / Ship Prel Design & Feasibility Studies				3389 / OPLOG IPT Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3389: OPLOG IPT Development	0.000	12.510	0.000	12.955	-	12.955	22.141	9.320	9.494	9.687	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY2016 and prior year efforts were financed under PE 0408042N, National Defense Sealift Fund (NDSF) BA 04, Project 3117 Naval Operational Logistics (OPLOG) Integration. FY2017, FY2019 and out-years are financed under this program element. This project is not a new start.

A. Mission Description and Budget Item Justification

Project 3389 - Develops enabling technologies for future and in-service afloat operational logistics and integrated supply systems; defines integrated combat logistics force and combatant logistics requirements; and conducts cooperative initiatives with acquisition programs, program sponsors, engineering managers, the Navy science and technology community, and Fleet customers. OPLOG develops integrated, cross-platform (i.e. applicable to more than one ship class/type) operational logistics and energy conservation technologies and capabilities as well as draft acquisition and operations policy ensuring future Naval systems leverage emerging logistic capabilities and technologies to provide operationally effective and energy efficient logistics delivery.

Though the operational logistics family of systems touches all aspects of Naval presence and power projection, operational logistics capability and system interfaces typically have been left to individual acquisition programs to develop and resolve. Technology development is necessary to mitigate technological and operational risk before ship acquisition programs accept new technologies. This project provides a foundation for the transition and systems development of science & technology initiatives evolving from the Office of Naval Research (ONR) Power & Energy Future Naval Capabilities (FNC), Enterprise and Platform Enablers FNC, Seabasing FNC, and from other enabling Government, industry and academia concepts to the acquisition community. Thus, this project resources continued research and development of appropriate technologies with applicability to multiple acquisition programs and defines and matures performance and interface requirements for those technologies. This project continues to identify, develop, integrate, demonstrate, and transition logistics technologies to improve the cost effectiveness of Fleet at sea logistics delivery through outreach, coordination and collaboration with industry, academia, Fleet, and Enterprise representatives.

This project will continue to develop improved shipboard replenishment, transfer, and handling systems and components as well as asset visibility and standardized packaging technologies. This project includes development of approaches to reduce operation and maintenance costs of, and energy consumption by the logistics Fleet. This integrated suite of developed capabilities will enable multiple ship types to leverage common technologies common across DoD (Joint) and commercial transportation networks providing a more affordable, energy efficient, mission capable force. These capabilities and system-of-systems approach will be applied to concept development of future auxiliary force architectures.

FY18 efforts were financed under NDSF,N BA04 Project

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies	Project (Number/Name) 3389 / OPLOG IPT Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Advanced Systems	Articles:	1.943	0.000	5.800	0.000	5.800
FY 2018 Plans: N/A		-	-	-	-	-
FY 2019 Base Plans: Research, development, and testing of advanced refueling systems and concepts to include performing relevant-testing of JOFF and REFS systems and complete detailed design in preparation for FY20 full-scale prototype fabrication and evaluation.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase result of program requirements moving from BA04 PE0408042N, National Defense Sealift Fund (NDSF) Project 3117 Naval Operational Logistics (OPLOG) Integration (FY16 and prior and FY18) to this budget for FY19 and follow.						
Title: Logistics Architectures	Articles:	0.050	0.000	0.050	0.000	0.050
FY 2018 Plans: N/A		-	-	-	-	-
FY 2019 Base Plans: Conduct combat logistics force data collection and operational studies.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase result of program requirements moving from BA04 PE0408042N, National Defense Sealift Fund (NDSF) Project 3117 Naval Operational Logistics (OPLOG) Integration (FY16 and prior and FY18) to this budget for FY19 and follow.						
Title: Shipboard Energy Conservation (E-STREAM)	Articles:	5.000	0.000	1.119	0.000	1.119
		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603564N / Ship Prel Design & Feasibility Studies	3389 / OPLOG IPT Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
FY 2018 Plans: N/A						
FY 2019 Base Plans: Continue energy management approach improvements including efficient ESTREAM system and components. Data package development and prototype purchase, installations, and testing for energy initiatives including efficient shipboard replenishment at sea (RAS)Hybrid E-STREAM planned for FY 2019.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase result of program requirements moving from BA04 PE0408042N, National Defense Sealift Fund (NDSF) Project 3117 Naval Operational Logistics (OPLOG) Integration (FY16 and prior and FY18) to this budget for FY19 and follow.						
Title: Shipboard Energy Conservation (Other)	Articles:	5.517	0.000	5.986	0.000	5.986
FY 2018 Plans: N/A		-	-	-	-	-
FY 2019 Base Plans: Continue energy management approach improvements including validation of energy savings from implementation of energy conservation measures, identification and evaluation of additional energy conservation concepts, transition of successful energy conservation measures of MSC and coordination with other Navy energy conservation programs to leverage successful energy reduction approaches.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase result of program requirements moving from BA04 PE0408042N, National Defense Sealift Fund (NDSF) Project 3117 Naval Operational Logistics (OPLOG) Integration (FY16 and prior and FY18) to this budget for FY19 and follow.						
Accomplishments/Planned Programs Subtotals		12.510	0.000	12.955	0.000	12.955

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603564N / <i>Ship Prel Design & Feasibility Studies</i>						Project (Number/Name) 3389 / <i>OPLOG IPT Development</i>	
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2019</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• NDSF/0408042N/3117: <i>3117/Naval Operational Logistics Integration</i>	0.000	11.729	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	29.656

Remarks

FY18 and out funds realigned to the NDSF appropriation BA05 PE 0408042N RDTE PRJ
3117

D. Acquisition Strategy

Not applicable for OPLOG R&D efforts

E. Performance Metrics

Annual Program Review

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies				Project (Number/Name) 3389 / OPLOG IPT Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Various	VARIOUS : Various	0.000	2.650	Jan 2017	0.000		5.357	Jan 2019	-		5.357	Continuing	Continuing	Continuing
Ancillary Hardware Development	Various	VARIOUS : Various	0.000	1.296	Jan 2017	0.000		1.500	Jan 2019	-		1.500	Continuing	Continuing	Continuing
Ship Integration	Various	VAROUS : Various	0.000	1.200	Jan 2017	0.000		0.600	Jan 2019	-		0.600	Continuing	Continuing	Continuing
Ship Suitability	Various	VARIOUS : Various	0.000	0.750	Jan 2017	0.000		0.500	Jan 2019	-		0.500	Continuing	Continuing	Continuing
System Engineering	Various	VARIOUS : Various	0.000	1.250	Jan 2017	0.000		0.940	Jan 2019	-		0.940	Continuing	Continuing	Continuing
		Subtotal	0.000	7.146		0.000		8.897		-		8.897	Continuing	Continuing	N/A
Remarks															
Award dates reflect initial award of incremental execution.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Suport	Various	VARIOUS : Various	0.000	0.750	Jan 2017	0.000		0.900	Jan 2019	-		0.900	Continuing	Continuing	Continuing
Software Development	Various	VARIOUS : Various	0.000	0.000		0.000		0.050	Jan 2019	-		0.050	Continuing	Continuing	Continuing
Integrated Logistics Support	Various	VARIOUS : Various	0.000	0.300	Jan 2017	0.000		0.350	Jan 2019	-		0.350	Continuing	Continuing	Continuing
Configuration Management	Various	VARIOUS : Various	0.000	0.500	Jan 2017	0.000		0.400	Jan 2019	-		0.400	Continuing	Continuing	Continuing
Technical Data	Various	VAROUS : Various	0.000	0.800	Jan 2017	0.000		0.600	Jan 2019	-		0.600	Continuing	Continuing	Continuing
Studies & Analysis	Various	VARIOUS : Various	0.000	0.367	Jan 2017	0.000		0.135	Jan 2019	-		0.135	Continuing	Continuing	Continuing
		Subtotal	0.000	2.717		0.000		2.435		-		2.435	Continuing	Continuing	N/A
Remarks															
Award dates reflect initial award of incremental execution.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies			
Project (Number/Name) 3389 / OPLOG IPT Development															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	Various	VARIOUS : Various	0.000	1.297	Jan 2017	0.000		0.700	Jan 2019	-		0.700	Continuing	Continuing	Continuing
Operational Test & Evaluation	Various	VARIOUS : Various	0.000	1.000	Jan 2017	0.000		0.573	Jan 2019	-		0.573	Continuing	Continuing	Continuing
Subtotal			0.000	2.297		0.000		1.273		-		1.273	Continuing	Continuing	N/A
Remarks Award dates reflect initial award of incremental execution.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	Various	VARIOUS : Various	0.000	0.100	Jan 2017	0.000		0.100	Jan 2019	-		0.100	Continuing	Continuing	Continuing
Government Engineering Support	Various	VARIOUS : Various	0.000	0.250	Jan 2017	0.000		0.250	Jan 2019	-		0.250	Continuing	Continuing	Continuing
Subtotal			0.000	0.350		0.000		0.350		-		0.350	Continuing	Continuing	N/A
Remarks Award dates reflect initial award of incremental execution.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	12.510		0.000		12.955		-		12.955	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603564N / Ship Prel Design &
Feasibility Studies

Project (Number/Name)

3389 / OPLOG IPT Development

Exhibit R-4, RDT&E Schedule Profile: PB 19 Navy

Date: January 2018

Appropriation/Budget Activity

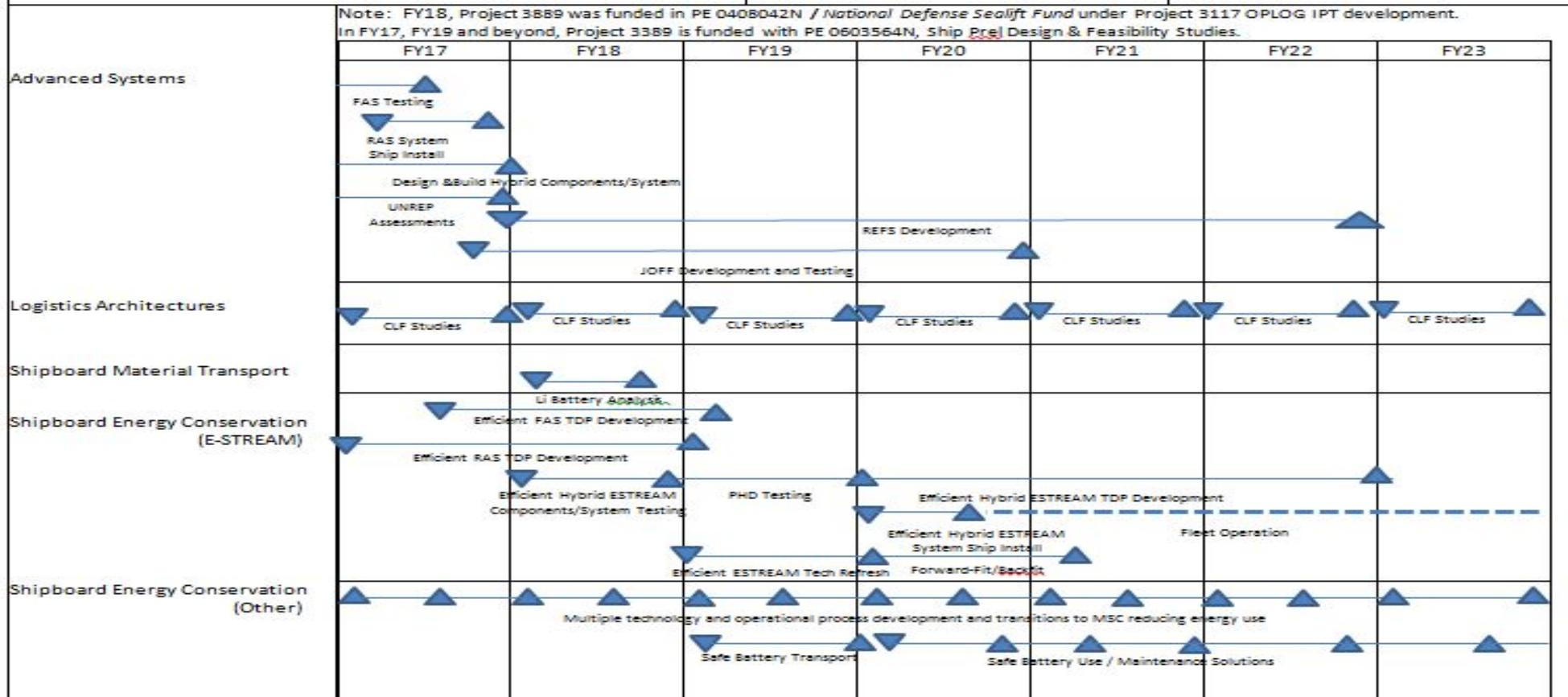
4557 / 04

R-1 Program Element (Number/Name)

PE 0603564N, Ship Prel Design & Feasibility Studies

Project (Number/Name)

Project 3389 OPLOG IPT development



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603564N / Ship Prel Design & Feasibility Studies	Project (Number/Name) 3389 / OPLOG IPT Development		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 3389</i>				
Advanced Systems		1	2017	4
Logistics Architectures		1	2017	4
Shipboard Energy Conservation (E-STREAM)		1	2017	4
Shipboard Energy Conservation (Other))		1	2017	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603570N / Advanced Nuclear Power Systems								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	453.313	329.500	256.137	-	256.137	181.650	149.186	130.625	133.055	Continuing	Continuing	
1258: Nuclear Technology Development	0.000	62.987	64.038	66.037	-	66.037	67.644	69.101	70.483	76.214	Continuing	Continuing	
3219: SBSD Nuclear Technology Development	0.000	390.326	265.462	190.100	-	190.100	114.006	80.085	60.142	56.841	Continuing	Continuing	
Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): P444													

A. Mission Description and Budget Item Justification

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

B. Program Change Summary (\$ in Millions)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	453.313	329.500	256.146	-	256.146
Current President's Budget	453.313	329.500	256.137	-	256.137
Total Adjustments	0.000	0.000	-0.009	-	-0.009
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	-0.009	-	-0.009

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603570N / Advanced Nuclear Power Systems				Project (Number/Name) 1258 / Nuclear Technology Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
1258: Nuclear Technology Development	0.000	62.987	64.038	66.037	-	66.037	67.644	69.101	70.483	76.214	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603570N / Advanced Nuclear Power Systems				Project (Number/Name) 3219 / SBSD Nuclear Technology Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3219: SBSD Nuclear Technology Development	0.000	390.326	265.462	190.100	-	190.100	114.006	80.085	60.142	56.841	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

Project MDAP/MAIS Code: P444**A. Mission Description and Budget Item Justification**

The details of this program element are classified CONFIDENTIAL and are submitted annually to Congress in the classified budget justification books.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603573N / Advanced Surface Machinery Sys								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	195.686	30.255	29.953	22.109	-	22.109	21.251	20.799	21.213	21.667	Continuing	Continuing	
2471: Integrated Power Systems (IPS)	195.686	30.255	29.953	22.109	-	22.109	21.251	20.799	21.213	21.667	Continuing	Continuing	

A. Mission Description and Budget Item Justification

The FY 2019 funding request was reduced by \$0.092 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

This Program Element (PE) includes the development of advanced surface ship hull, mechanical, and electrical (HM&E) components and systems for all future ships and back-fit ships where appropriate as well as development of Cybersecurity Boundary Defense Capabilities for HM&E systems. This PE is managed by PMS 320, the Electric Ships Office, located organizationally within PEO SHIPS, responsible for developing Naval Power and Energy Systems that focus power system integration of Directed Energy (DE) and other high powered mission systems as well as platform integration and improving energy efficiency of those components and systems. The mission of PMS 320 is to develop and provide smaller, simpler, more affordable and more capable electric power systems for all Navy platforms, focus Navy and industry investments, and reduce total ownership cost.

This PE serves as the bridge between Science and Technology (S&T) and ship platform and mission systems acquisition programs by identifying prospective applications for S&T research, advanced development, and performing additional product development and qualification when necessary to meet platform or mission system requirements. This PE also includes HM&E cybersecurity Boundary Defense Capability (BDC) development. The HM&E systems to be protected from cyber-attack by BDC include Machinery Control Systems, Electric Power Systems, Damage Control and Firefighting, Auxiliary Machinery and Fluid Systems, Engines and Power Transmission Systems, Gas Turbine Systems, Video Systems, as well as other HM&E systems. Cybersecurity BDC will allow the ship to better protect, detect, respond, and recover from a cyber attack.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	36.655	29.953	22.596	-	22.596
Current President's Budget	30.255	29.953	22.109	-	22.109
Total Adjustments	-6.400	0.000	-0.487	-	-0.487
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.604	0.000			
• Program Adjustments	0.000	0.000	-0.092	-	-0.092
• Rate/Misc Adjustments	0.001	0.000	-0.395	-	-0.395
• Congressional Directed Reductions	-5.797	-	-	-	-
Adjustments					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys				Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2471: <i>Integrated Power Systems (IPS)</i>	195.686	30.255	29.953	22.109	-	22.109	21.251	20.799	21.213	21.667	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This project supports the development and transition of Naval Power and Energy Systems including power generation, power conversion, power distribution, energy storage, power utilization and automation and control functions for fully integrated electric propulsion (such as T-AKE -1 class or DDG 1000 class), hybrid electric propulsion (such as LHD 8 and LHA(R) class), as well as legacy mechanical propulsion ships (such as DDG51 class). This project supports optimized integration of Directed Energy (DE) and other high powered mission systems, appropriate component and system controls, integration of components and systems into future and current ships, and providing power and energy system solution alternatives to new and existing platforms. Existing ships' power systems require optimized integration via energy storage and advanced controls techniques to withstand the effects of DE and other high powered mission systems and avoid negative impacts to power generating equipment (diesel/gas turbine engines and generators).

Project developments are aligned with the Navy's 30 year shipbuilding plan via the Naval Power and Energy Systems Technology Development Roadmap (TDR), which outlines the way ahead for future developments and provides a basis for coordinated planning and investment by the Navy and private industry.

This project develops and transitions products that electrically integrate and provide power to mission systems, integrates those components and systems into ship platforms, increases energy efficiency, and provides cybersecurity capabilities for current in-service Hull, Mechanical and Electrical (HM&E) systems as well as future systems.

The systems developed by this Project are by their very nature the foundation of the ships kill chain, and are developed with efficiency requirements as part of total life cycle cost minimization. Efforts within Power and Energy Systems are to design, develop, test and integrate shipboard power systems to incorporate advanced sensors, directed energy and other advanced weapons. Design and testing includes modeling and simulation, as well as land based testing, to reduce risk and demonstrate readiness for shipboard use.

Cybersecurity: Develops an approach to implement a cybersecurity Boundary Defense Capability (BDC) for HM&E control systems on surface ships. The HM&E systems to be protected from cyber-attack by BDC include machinery control systems, electric power systems, damage control and firefighting, auxiliary machinery and fluid systems, engines and power transmission systems, gas turbine systems, video systems, as well as other HM&E systems. Design and technical data packages for software and hardware solutions will be developed. Cybersecurity BDC will allow the ship to better protect, detect, respond, and recover from cyber-attack.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Power and Energy Systems	16.999	16.024	13.241	0.000	13.241

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
1319 / 4	PE 0603573N / Advanced Surface Machinery Sys	2471 / Integrated Power Systems (IPS)			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
				Articles:	
FY 2018 Plans:					
Complete manufacture and Factory Acceptance Testing (FAT) and deliver the 4.2MW AG9160RF Gas Turbine Generator (GTG) to the Naval Surface Warfare Center (NSWC) - Philadelphia, PA for DDG51 Flight III electrical integration testing. The AG9160RF Gas Turbine Generator (GTG) is an upgrade to the DDG1000 auxiliary gas turbine and will provide increased power to meet DDG51 Flight III requirements for advanced sensors and future weapons with reduction in life cycle costs through increased fuel efficiency over legacy gas turbine generator sets.					
Conduct First Article Test and Power Hardware in the Loop (PHIL) testing at Florida State University Center for Advanced Power Systems (FSU CAPS) on Air and Missile Defense Radar (AMDR) Power Conversion Modules (PCM) Low Rate Initial Power (LRIP) units. Complete Environmental Qualification Test (EQT) and support delivery and installation of AMDR PCM LRIP units for PCM / AMDR combat system integration testing. Deliver AMDR PCM LRIP units to DDG51 Flight III land based test site. Continue to provide support for AMDR PCM units during PCM / AMDR combat system integration testing and electrical system validation testing at the DDG 51 Flight III test sites. AMDR PCM provides power conversion from ship's 4160 Volts Alternating Current (VAC) distribution systems to 1000 Volts Direct Current (VDC) to support the AMDR on DDG 51 Flight III Class Ships.					
Continue planning for future gas turbine operational readiness and fuel efficiency upgrades.					
In order to obtain early insight into the effects of high power and energy mission systems on ships electric power systems, evaluate shipboard power and energy systems, and evaluate power system performance at lower cost than full-scale hardware system testing, simulated electrical system integration testing using power and energy system components will be conducted at the Center for Advanced Power System at Florida State University (FSU CAPS). This lower-cost approach to testing is referred to as Power Hardware In the Loop (PHIL). PHIL includes development of component computer models that simulate and emulate actual operating machinery components and shipboard power and energy systems. PHIL testing replaces component models with hardware once hardware development is complete. PHIL testing costs less than full-scale hardware system testing, shortens development time, and affords the opportunity to identify and mitigate risks in a deliberate fashion from specification development to computer model development to hardware development resulting in a more affordable and robust end product. PHIL testing reduces developmental risk, and demonstrates performance potential prior to live hardware integration testing.					
FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Receive, install, check-out, and integrate the Energy Storage Module (ESM) prototype into the test site at FSU CAPS. Conduct PHIL testing of the ESM prototype to demonstrate Energy Magazine (EM). Energy Magazine (EM) serves as the energy resource to enable the introduction of pulsed high power and energy weapons and sensor systems by providing a buffered interface between legacy power systems and new generation weapons and sensors. (Note: The ESM prototype will be tested at FSU CAPS and results will be exchanged with the United Kingdom (UK) Ministry of Defence (MOD) via the Advanced Electrical Power and Propulsion Project (AEP3) Project Arrangement and the OSD Coalition Warfare Program (CWP) Directed Energy Power Systems (DEPS) project.)	Conduct PHIL testing of emulated high powered weapons and sensors into ships electrical systems at FSU CAPS. Complete simulated electrical system integration testing of multiple pulsed mission systems integrated into a single branch of a ship's power system in stressing scenarios requiring controlled power flow.					
Complete simulated electrical system integration testing of multiple pulsed mission systems along with a large sensor load integrated into a new notional Medium Voltage Direct Current (MVDC) Integrated Power & Energy System (IPES) architecture, focused on demonstrating fault detection and isolation utilizing new MVDC circuit breakers developed by ONR and transitioning to PMS 320. IPES adds distributed EM functionality and advanced cyber safe controls to the Integrated Power System of ships such as DDG1000 for enhanced survivability, efficient sharing of power and energy resources between ship propulsion, mission systems and ship service loads.	Conduct design review of the ESM prototype for use in Stable Backup Power (SBP) applications, identify necessary modifications required and appropriate test configurations. Evaluate ESM prototype for use in providing shipboard energy storage to reduce individual component Uninterruptible Power Supply (UPS) systems.					
Continue to refine real time simulation models of various ship classes to reflect learning and state of ongoing development of power and energy system components and pulsed, high power and energy weapons and sensor systems (i.e. Directed Energy Weapons, e.g. laser).	Complete planning for FY 19 simulated electrical system integration testing using real time power hardware in the loop at FSU CAPS.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	<p>Continue to develop performance specification and required attributes for next generation compact high power Advanced Power Generation Module (APGM). Develop computer component models and commence system level modeling and simulation efforts.</p> <p>FY 2019 Base Plans:</p> <p>Increased warfighting capabilities using pulsed high power and energy weapons and sensors (i.e., lasers, advanced radars, etc.) require shipboard energy storage systems to buffer the interface between legacy ship electric distribution systems and the power and energy requirements of new generation weapons and sensors. Prior to FY19, this PE has designed, built, and tested the Energy Storage Module (ESM) prototype. Lessons learned from ESM prototype development are being incorporated into the Energy Magazine (EM), an energy storage system with advanced controls, to serve as the energy resource to enable the introduction of pulsed high power and energy weapons and sensor systems. When fully integrated, EM is expected to also reduce the number of Uninterruptable Power Supply (UPS) on ships which decreases maintenance and costs.</p> <p>The EM energy storage system includes power electronics, controls, power conversion components, and energy storage media. Pulsed high power and energy weapons and sensors require different levels of power and energy storage devices with system specific dynamic interfaces (how quickly power/energy is required). As part of EM development, this PE is pursuing a variety of energy storage media and a common interface to these various storage media for ease of inter-operability in the future. Examples of energy storage media include batteries (i.e., lithium iron phosphate), capacitors, ultra-capacitors, and flywheels.</p> <p>Develop and deliver executable models and an EM Model Description Document (MDD) that capture the behavior of the system, conduct control system analysis, generate detailed interface requirements, and generate test scenarios and sequences. Continue development of an EM software control system emulator to validate the performance and interfaces of the EM controls. Begin acquiring hardware, fabricate assemblies, and commence component level testing and assembly of the EM prototype unit. The hardware includes the storage media, power electronics, interconnecting cabling, and associated equipment.</p> <p>Prepare for the future transition of Advanced Controls developed by ONR's Robust Combat Power Control Future Naval Capability (FNC) to this PE in FY21. Advanced Controls take full advantage of power and energy resources within the ship's machinery control system to deliver mission systems the power and energy they require when required. Advanced controls configure the system to operate at max efficiently when appropriate</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	<p>and switch to max performance when necessary through three-way communication and control between the machinery control system, mission planning and pulsed high power and energy weapon systems and sensors.</p> <p>This PE has developed a low-cost approach to testing, referred to as PHIL, which employs computer models that simulate and emulate actual operating machinery components and shipboard power and energy systems. PHIL testing replaces component models with hardware once hardware development is complete. PHIL testing costs less than full-scale hardware system testing, shortens development time, and affords the opportunity to identify and mitigate risks in a deliberate fashion from specification development to computer model development to hardware development resulting in a more affordable and robust end product. PHIL testing provides early insight into the effects of high power and energy mission systems (i.e., laser, advanced radars, etc.) on a ship's electric power system, evaluates shipboard power and energy systems, and evaluates power system performance. The PHIL test site is located at Florida State University's Center for Advanced Power System (FSU CAPS). PHIL testing at FSU CAPS has been ongoing since FY17. Eight different PHIL demonstrations were planned with 5 to be completed through FY18 and 3 planned in FY19. PHIL demonstrations to date have replaced component models with the United Kingdom's Flywheel Energy Storage System (FESS), the ESM prototype unit developed by this PE, and Advanced Circuit Protection Devices developed by ONR. The purpose of the FY19 demonstrations is to focus on DDG 51 FLT III and Future Surface Combatants with multiple high pulsed power loads; and to de-risk EM, advanced electrical architectures, power conversion equipment, and controls for implementation into an Integrated Power and Energy System (IPES).</p> <p>Conduct feasibility studies, cost based assessments, and begin developing technical and performance specifications for an Integrated Power & Energy System (IPES) in support of future surface combatant and mission system power and energy requirements. Identify shared energy storage and advanced controls requirements enabling an affordable, scalable and flexible power system to meet current and future needs. Refine IPES notional architectures and risk assessments through studies and industry engagement. Draft performance specifications for IPES system, equipment and components. Develop computer component models and commence system level modeling and simulation efforts. Plan for land based testing activities.</p> <p>Continue planning for future gas turbine operational readiness and fuel efficiency upgrades.</p> <p>Continue to define performance requirements, explore trade space in next generation compact high power Advanced Power Generation Modules (APGM), develop characterization data used to conduct ship design studies and to establish a benchmark for performance comparison, develop a stand-alone technical description</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys		Project (Number/Name) 2471 / Integrated Power Systems (IPS)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
document which describes performance characteristics, evaluate the effect of large pulse loads from future electric weapons on the cycle life of gas turbine engines, and engine capability to respond to such pulse loads without an unacceptable reduction in time between overhaul. Conduct feasibility studies, Cost Based Assessments, and begin developing performance and technical specifications for next generation compact high power Advanced Power Conversion Module (APCM) incorporating high band gap materials such as silicon carbide. Develop computer component models and commence system level modeling and simulation efforts.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 is due to transitioning to production mission critical hardware for DDG 51 Flight III (AG9160RF Gas Turbine Generator (GTG) and AMDR PCMs).						
Title: Naval Power Technology Development / Platform Integration & Transition		Articles:				
FY 2018 Plans: Continue to execute the Advanced Electric Power and Propulsion Systems Development Project ((short title is AEP3), Project Arrangement (PA) ref DoD-MOD-N-12-0001 which is an agreement between the US and UK Governments to cooperate on a scope of work associated with characterizing, developing, modeling, and de-risking electrical power and propulsion system architectures and equipment for future surface and submarine platforms to meet the needs of both Navies. Complete execution of PA complimentary effort (Directed Energy Power Systems (DEPS) under the Coalition Warfare Program (CWP)). Continue to develop power and propulsion system configurations in support of future surface ship acquisition programs. Develop alternative power and propulsion solutions for future surface combatants and amphibious ships. Continue to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continue assessments of Naval Power and Energy System alternate architectures to best meet emerging ship requirements.		1.104	1.104	1.104	0.000	1.104

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Complete biennial update of the Naval Power and Energy Systems (NPES) Technology Development Roadmap (TDR). Support maturation and transition of ONR Future Naval Capabilities (FNC) products to meet NPES TDR identified gaps.						
Continue to support maturation and transition of ONR Future Naval Capabilities (FNC) products to meet NPES TDR identified gaps.						
Continue Combat Power and Energy System Overarching Integrated Product Team (OIPT).						
Continue to generate strategy, technology development plan and resource requirements for future surface combatant integrated power and energy system.						
FY 2019 Base Plans: Continue to execute the Advanced Electric Power and Propulsion Systems Development Project (short title is AEP3), Project Arrangement (PA) ref DoD-MOD-N-12-0001 which is an agreement between the US and UK Governments to cooperate on a scope of work associated with characterizing, developing, modeling, and de-risking electrical power and propulsion system architectures and equipment for future surface and submarine platforms to meet the needs of both Navies.						
Continue to develop power and propulsion system configurations in support of future surface ship acquisition programs. Develop alternative power and propulsion solutions for future surface combatants and amphibious ships. Continue to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continue assessments of Naval Power and Energy System alternate architectures to best meet emerging ship requirements.						
Commence biennial update of the Naval Power and Energy Systems (NPES) Technology Development Roadmap (TDR).						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue to support maturation and transition of ONR Future Naval Capabilities (FNC) products to meet NPES TDR identified gaps.						
Support transition from ONR of Silicon Carbon (and other high bandgap semiconductor materials) based power electronic modules. High band gap semiconductor materials operate at high speeds and temperatures as compared with silicon based materials affording more compact, thermally tolerant power conversion equipment making them highly desirable for naval applications.						
Continue Combat Power and Energy System Overarching Integrated Product Team (OIPT).						
Continue to generate strategy, technology development plan and resource requirements for future surface combatant integrated power and energy system.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no increase or decrease to the funding level between FY18 and FY19. Continue to execute requirements as outlined in the FY 2018 and FY 2019 plans.						
Title: Cybersecurity Boundary Defense Capability	Articles:	12.152	12.825	7.764	0.000	7.764
FY 2018 Plans: FY 2018 plans will include the testing of the Cybersecurity Boundary Defense Capability (BDC) in Navy land based site laboratories and on combatants and amphibious ships as non-permanent changes. The intent of the testing is to demonstrate the overall approach to implement a cybersecurity boundary defense capability for Hull, Mechanical and Electrical (HM&E) control systems on surface ships as being an effective approach. HM&E systems to be protected will include Machinery Control Systems, Electric Power Systems, Damage Control and Firefighting, Auxiliary Machinery and Fluid systems, Engines and Power Transmission Systems, Gas Turbine Systems, Video Systems as well as other HM&E systems. Design and technical data packages for software and hardware solutions will be developed. The intent of the total boundary defense capability will be to allow the ship to better protect, detect, respond, and recover from potential cyber attacks on the HM&E enclave on surface ships		-	-	-	-	-
FY 2019 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The FY19 plans will include the continued detailed development testing and system integration of the common Cybersecurity Boundary Defense Capability (BDC) for H,M&E systems to be applied across multiple ship classes. This capability will include both a BDC capability and cyber situational awareness tools for the H,M&E systems. HM&E systems to be protected will include Machinery Control Systems, Electric Power Systems, Damage Control and Firefighting, Auxiliary Machinery and Fluid systems, Engines and Power Transmission Systems, Gas Turbine Systems, Video Systems as well as other HM&E systems. Design and technical data packages for software and hardware solutions will be developed. The intent of the total boundary defense capability will be to allow the ship to better protect, detect, respond, and recover from potential cyber attacks on the HM&E enclave on surface ships.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 is due to transitioning to production. Cybersecurity Boundary Defense Capability (BDC) was funded in FY 2016 in PE: 0604567N / PU 1803 to establish the infrastructure and detailed plans to fully execute Cybersecurity starting 1 Oct 16. FY 2017-2021 cybersecurity efforts are budgeted in PE 0603573N / PU 2471.						
Accomplishments/Planned Programs Subtotals		30.255	29.953	22.109	0.000	22.109
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
This program develops and transitions higher performance and more affordable electric power and propulsion systems to both new construction and back fit ship applications using an evolutionary acquisition approach. For new contract awards, full and open competition is utilized to the maximum extent possible to provide maximum benefit to the Navy at the lowest possible cost to the taxpayer. When able to meet Navy requirements, commercial technology is leveraged to further minimize cost to the Navy. Cybersecurity efforts will maximize use of government field activity labs and already contracted HM&E equipment vendors.						
E. Performance Metrics						
This project will execute 100% of the signed Technology Transition Agreements with ONR; complete 100% of the advanced developments currently planned for the Energy Storage Module and Power Generation Module; achieve up to 10% Specific Fuel Consumption (SFC) improvement for Advanced Power Generation Module; mature technology to Technology Readiness Level (TRL) 6 by milestone decisions for ship acquisition program; and, complete HM&E cybersecurity studies and						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)
production of a boundary defense capability architecture and implementation approach for HM&E systems on surface ships in alignment with the Task Force Cyber Awareness (TFCA) goals.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys				Project (Number/Name) 2471 / Integrated Power Systems (IPS)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	SS/FFP	Rolls Royce : Walpole, MA	33.006	3.391	Oct 2016	1.506	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	SS/BOA	General Electric Company : Cincinnati, OH	3.560	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	C/FFP	DRS : DRS, Milwaukee WI	40.677	5.256	Dec 2016	5.345	Dec 2017	5.118	Oct 2018	-		5.118	Continuing	Continuing	Continuing
Product Development	C/CPFF	Various : Various	38.224	3.529	Oct 2016	4.747	Oct 2017	4.722	Oct 2018	-		4.722	Continuing	Continuing	Continuing
Product Development	WR	NSWCPD : Phila, PA	52.127	4.340	Oct 2016	4.530	Oct 2017	3.505	Oct 2018	-		3.505	Continuing	Continuing	Continuing
Cybersecurity BDC	WR	NSWCPD : Phila, PA	0.000	4.223	Oct 2016	5.400	Nov 2017	3.353	Nov 2018	-		3.353	Continuing	Continuing	Continuing
Cybersecurity BDC	C/CPIF	Boeing : Huntington Beach, CA	0.000	0.700	Jun 2017	0.700	Jan 2018	0.500	Feb 2019	-		0.500	Continuing	Continuing	Continuing
Cybersecurity BDC	C/FP	Various HM&E Equipment Vendors : Various	0.000	1.998	Mar 2017	3.000	Jan 2018	0.500	Jan 2019	-		0.500	Continuing	Continuing	Continuing
Cybersecurity BDC	C/CPIF	Various : Various	0.000	3.000	Apr 2017	0.250	Jan 2018	0.700	Jan 2019	-		0.700	Continuing	Continuing	Continuing
Product Development	WR	Various Govt : Various	0.000	0.633	Jan 2017	0.000		0.000		-		0.000	0.000	0.633	-
Cybersecurity BDC	C/CPFF	JHU APL : Laurel, MD	0.000	2.231	Mar 2017	3.475	Jan 2018	2.711	Dec 2018	-		2.711	0.000	8.417	-
Subtotal		167.594	29.301		28.953		21.109		-			21.109	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	WR	NSWCCD-SSES : Phila, PA	24.954	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal		24.954	0.000		0.000		0.000		-			0.000	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys				Project (Number/Name) 2471 / Integrated Power Systems (IPS)								
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management	C/CPFF	Herren Associates : Alexandria, VA	3.138	0.954	Feb 2017	1.000	Dec 2017	1.000	Oct 2018	-		1.000	Continuing	Continuing	Continuing	
		Subtotal	3.138	0.954		1.000		1.000		-		1.000	Continuing	Continuing	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
			Project Cost Totals	195.686	30.255		29.953		22.109		-		22.109	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

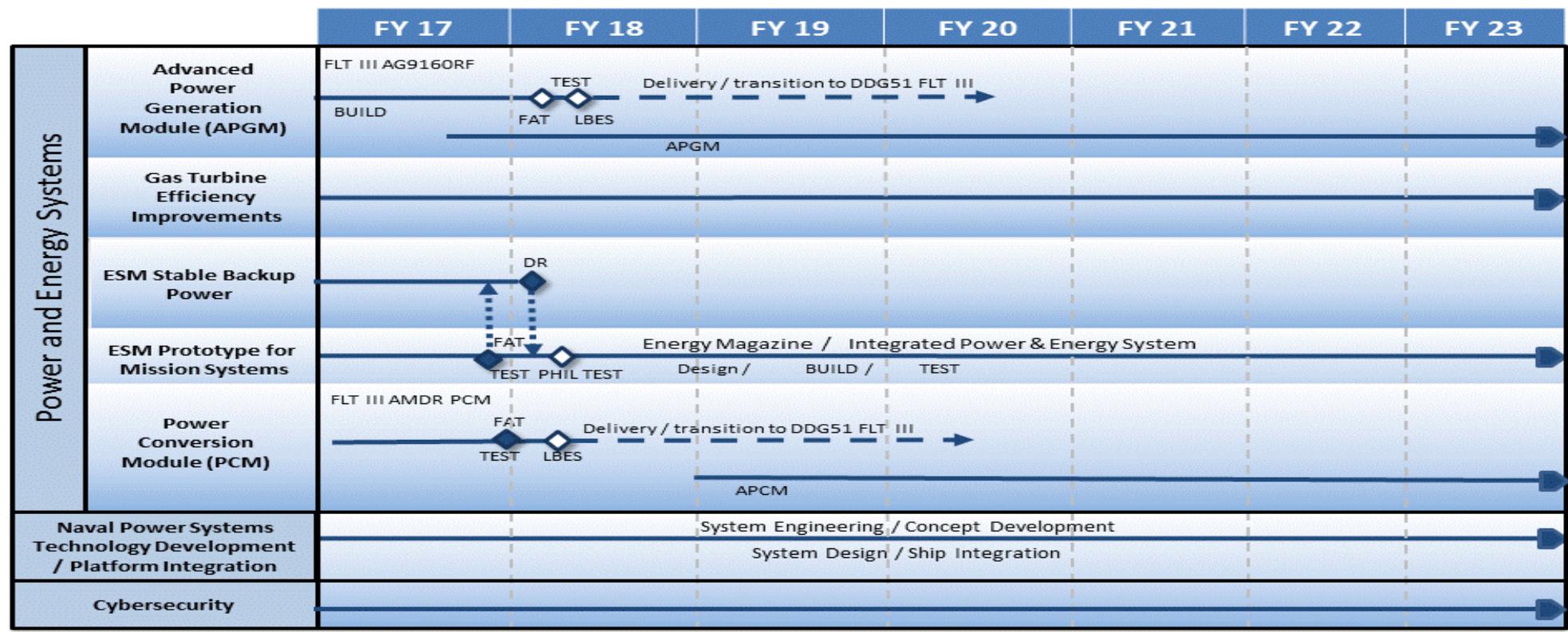
1319 / 4

R-1 Program Element (Number/Name)

PE 0603573N / Advanced Surface
Machinery Sys

Project (Number/Name)

2471 / Integrated Power Systems (IPS)

PE 0603573N

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603573N / Advanced Surface Machinery Sys	Project (Number/Name) 2471 / Integrated Power Systems (IPS)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2471				
Power and Energy Systems	1	2017	4	2023
Naval Power Technology Development / Platforms Integration & transition	1	2017	4	2023
Cybersecurity BDC	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603576N / (U)CHALK EAGLE								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	353.146	191.610	29.744	-	29.744	53.022	60.105	71.656	73.275	Continuing	Continuing	
1578: Chalk Eagle	0.000	353.146	191.610	29.744	-	29.744	53.022	60.105	71.656	73.275	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Previous President's Budget					367.016	191.610	30.713	-	30.713				
Current President's Budget					353.146	191.610	29.744	-	29.744				
Total Adjustments					-13.870	0.000	-0.969	-	-0.969				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					-	-	-	-	-				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					-13.739	0.000	-0.969	-	-0.969				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					0.000	0.000	-0.969	-	-0.969				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					-0.131	-	-	-	-				
Change Summary Explanation													
Technical: Not applicable.													
Schedule: Not applicable.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603581N / (U)LITTORAL COMBAT SHIP								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	1,288.069	50.806	40.991	27.997	-	27.997	12.577	7.571	0.893	0.915	Continuing	Continuing	
3096: Littoral Combat Ship	1,279.984	28.690	20.841	12.220	-	12.220	10.424	5.823	0.000	0.000	0.000	1,357.982	
4506: LCS Training	8.085	22.116	20.150	15.777	-	15.777	2.153	1.748	0.893	0.915	Continuing	Continuing	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): 374													
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$3.154 million to account for the availability of prior year execution balances.													
The FY 2019 funding request was reduced by \$0.267 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.													
This Program Element (PE) provides funds for detailed design, development, construction, issue resolution, certification, integration, and testing of the Littoral Combat Ship (LCS). LCS operates with focused-mission packages that deploy manned and unmanned vehicles to execute a variety of missions, including anti-submarine warfare (ASW), surface warfare (SUW), and mine countermeasures (MCM). LCS also possesses inherent capabilities, regardless of the mission package installed, including intelligence/surveillance/reconnaissance (ISR), maritime interdiction/interception operations (MIO), anti-terrorism/force protection (AT/FP), air warfare self-defense, joint littoral mobility, and logistic support for movement of personnel and supplies. This relatively small, shallow-draft, high-speed surface combatant complements the U.S. Navy's Surface Fleet by operating in environments where it is impossible or undesirable to employ larger, deeper-draft, multi-mission ships. LCS can deploy independently to overseas littoral regions or remain on station for extended periods of time either with a battle group or through a forward-basing arrangement. LCS will operate with Carrier Strike Groups, Surface Action Groups, or independently as dictated by the mission and environment. Additionally, LCS can operate cooperatively with the U.S. Coast Guard and Allies.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	51.630	40.991	34.428	-	34.428
Current President's Budget	50.806	40.991	27.997	-	27.997
Total Adjustments	-0.824	0.000	-6.431	-	-6.431
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.824	0.000			
• Program Adjustments	0.000	0.000	-6.003	-	-6.003
• Rate/Misc Adjustments	0.000	0.000	-0.428	-	-0.428
Change Summary Explanation					
In FY19, \$2.582M was reduced for Surface to Surface Mission Module (SSMM) Testing Support and \$3.154M was reduced from the FY19 funding request to account for the availability of prior year execution. Additional adjustments include \$0.267M for process improvement to increase efficiency in military spending and rate adjustments.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3096: Littoral Combat Ship	1,279.984	28.690	20.841	12.220	-	12.220	10.424	5.823	0.000	0.000	0.000	1,357.982
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 374

A. Mission Description and Budget Item Justification

The RDT&E portion of the LCS Program comprises design and development efforts required to field the LCS Class Ships, including integration with the Mission Packages (MCM, ASW and SUW) activities both pre- and post-delivery. It includes the design and development effort required to support the introduction and deployment of a Flight 0+ baseline (LCS 3/4 and Follow) with incorporation of lessons learned from the design and construction of USS Freedom (LCS 1) and USS Independence (LCS 2). Additionally, it includes design, development, issue resolution, certification and testing efforts required to support the design baseline for the six year block buy in FY10-15. This baseline will include lessons learned from the LCS 1 through LCS 4.

The LCS design and development phases include platform design and development, experimentation, ship system design and integration, hull platform testing, development of Technical Data Packages (TDPs), total ship system engineering and integration, combat systems and warfare systems certification, and planning and conduct of system testing. These efforts include procurement of combat and warfare system elements and/or simulators to support production representative testing in support of design, development, and certification efforts and ordnance in support of testing.

The RDT&E portion of LCS funding also comprises formal Developmental and Operational Assessment testing of the LCS Ships and Mission Packages. Test and Evaluation (T&E) will concentrate on verifying integration and interoperability of employed technologies and systems in the LCS seaframe designs and modular mission packages to achieve the mission capabilities and performance requirements as defined in the LCS program's Flight 0 and Flight 0+ Capabilities Development Documents (CDD). T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP) for the core seaframe and the focused missions.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: LCS System-of-Systems Development, Engineering & Experimentation Description: Provides for LCS Program systems engineering in support of Flight 0, Flight 0+, the FY10 Block Buy baseline design, and future procurement baseline design, development, certification, and production (including ship system design and integration); combat system and C4I design, integration, and test; aviation (manned and unmanned) integration; modular mine countermeasure (MCM), anti-submarine warfare (ASW), and surface warfare (SUW) mission package (MP) integration; logistics product development; and various systems engineering activities required to perform risk analyses of new design and production technology concepts.	17.780	15.209	9.792	0.000	9.792

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 3096 / Littoral Combat Ship				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: <p>Analyze data from the full ship model test of the Independence hull and provide technical evaluations of results. Provide systems engineering support for Air Defense test planning and execution on the Self Defense Test Ship in support of Probability of Raid Annihilation (PRA) on the Independence Variant. Provide systems engineering support for MCM integration testing on the Freedom and Independence Variants. Conduct analyses to qualify a lower cost, lighter weight thermal insulation on the Independence Variant.</p> <p>Provide systems engineering support for VTUAV Initial Operational Test & Evaluation (IOT&E) on Independence Variant and complete VTUAV Dynamic Interface testing on the Freedom Variant. Provide Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design scope on both Freedom and Independence Variants. Provide Seaframe and Mission Systems engineering support to certify equipment to include oversight of design changes required for any re-certification. Finalize technical and performance baseline for future ship procurements based on systems design and testing execution. Continue conducting studies in support of development of future technical and performance baseline design upgrades.</p>						
FY 2019 Base Plans: <p>Provide systems engineering support for Seaframe and MCM integration testing and DT on the Independence Variant. Provide systems engineering support for MCM DT on the Independence Variant. Provide systems engineering support for Seaframe and ASW MP DT TECHEVAL & IOT&E on the Freedom Variant. Provide systems engineering support for Torpedo Defense Mission Module (TDMM) integration testing on the Freedom and Independence Variants. Provide systems engineering support for Gun Missile Module (GMM), Surface to Surface Mission Module (SSMM) TECHEVAL, and Operation Test (OT) on the Freedom Variant.</p>						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The \$5.417M decrease from FY 2018 to FY 2019 is due to the winding down of the test program.						
Title: LCS Test & Evaluation Description: Execute formal LCS DT/OT, including Live Fire Test & Evaluation (LFT&E), and procurement of T&E Ordnance. Execute DT and C4I integration and testing, aviation integration (manned and unmanned), MCM, ASW, and SUW MP integration.	Articles: -	10.910	5.632	2.428	0.000	2.428

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018									
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP			Project (Number/Name) 3096 / Littoral Combat Ship															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017									
											FY 2018									
											FY 2019 Base									
											FY 2019 OCO									
											FY 2019 Total									
FY 2018 Plans: Complete Air Defense Test for Self Defense Test Ship. Begin planning for Air Defense Seafame testing in support of PRA on the Independence Variant. Conduct VTUAV Dynamic Interface testing on the Freedom Variant. Conduct VTUAV IOT&E on the Independence Variant. Continue work on FSAR. Conduct Assessment and Identification of Mine Susceptibility (AIMS), Advanced Degaussing (ADG), and Advanced Mine Simulation System (AMISS) testing on the Freedom Variant. Conduct AIMS and AMISS testing on the Independence Variant. Complete post FSST availability on LCS 5 and LCS 6. Complete DDISAR for LCS Freedom Variant. Complete DDISAR for Independence Variant.																				
FY 2019 Base Plans: Begin MCM DT through TECHEVAL on the Independence Variant. Conduct SUW DT efforts on Independence Variant. Conduct ASW DT on the Freedom Variant. Complete work on FSAR. Complete Air Defense Seafame testing in support of PRA on the Independence Variant. Conduct Seaframe and SUW MP SSMM DT, TECHEVAL, and IOT&E on the Freedom Variant.																				
FY 2019 OCO Plans: NA																				
FY 2018 to FY 2019 Increase/Decrease Statement: The \$3.204M decrease from FY 2018 to FY 2019 is due to the removal of the Surface to Surface Mission Module (SSMM) test and prior year under-execution reduction.																				
Accomplishments/Planned Programs Subtotals											28.690									
											20.841									
											12.220									
											0.000									
											12.220									
C. Other Program Funding Summary (\$ in Millions)																				
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost									
• SCN/2127: Littoral Combat Ship (LCS)	1,649.692	1,162.936	749.428	-	749.428	1,228.176	849.087	1,791.867	1,791.996	3,768.664	24,792.911									
• OPN/1600: LCS Common Mission Modules Equipment	14.670	34.666	46.732	-	46.732	51.553	36.657	55.776	29.787	734.284	1,427.898									
• OPN/0944: LCS Class Support Equipment	43.819	47.955	47.241	-	47.241	56.761	65.065	66.341	67.725	0.000	519.591									
• OPN/1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,501.531	2,771.262									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4				PE 0603581N / (U)LITTORAL COMBAT SHIP				3096 / Littoral Combat Ship			
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/1603: LCS SUW Mission Modules	21.064	52.960	26.006	-	26.006	26.566	15.342	15.711	52.511	5.104	315.024
• RDTEN/3129: LCS Mission Package Development	153.595	116.871	8.899	-	8.899	10.311	9.356	9.254	9.410	Continuing	Continuing
• OPN/1602: LCS ASW Mission Modules	0.000	0.000	57.294	-	57.294	52.754	63.181	34.104	34.777	142.398	384.508
• RDTEN/3086: Frigate	83.080	143.450	134.772	-	134.772	75.353	77.639	70.469	72.022	Continuing	Continuing
• OPN/1604: LCS In-Service Modernization	0.000	74.426	70.526	-	70.526	122.072	224.143	363.812	459.770	0.000	1,314.749
Remarks											
D. Acquisition Strategy											
The LCS program takes an evolutionary approach to acquisition that emphasizes competition as a key to achieving affordability. Initially, two industry teams competed against each other with two distinctly different LCS designs. The decision produced two flights with a vessel from each design: Flight 0 (LCS 1 and LCS 2); and Flight 0+ (LCS 3 and out). The Flight 0+ baseline incorporates lessons learned from the design, construction, and testing of the Flight 0 ships. The Navy conducted a limited competition amongst the existing LCS industry teams or team participants for the award of a contract for the construction of a block buy of up to ten (10) LCS Flight 0+ Class ships, with an objective of competitively awarding a single contract to a single industry team.											
By Acquisition Decision Memorandum of December 23, 2010, the USD (AT&L) authorized execution of an alternative acquisition strategy for the FY 2010 through FY 2015 procurement of 20 seaframes through two ten-ship block buy contracts. On December 29, 2010, the Navy awarded two contracts for block buys of up to ten ships, beginning with the award to each contractor of one FY 2010 ship and associated non-recurring engineering, the development of the Technical Data Package (TDP), core class services, and associated data. This was followed by the contractual funding of one ship to each contractor in FY 2011 and two ships each funded in FY 2012 through FY 2014.											
On October 17, 2014 USD(AT&L) approved the Navy's plan to procure three ships in FY 2015 and three ships in FY 2016 by modifying the current block buy contracts. The modification to each of the block buy contracts completed the previously approved 20 ship block buy procurement and added options for two FY 2016 ships for a total of 26 LCS ships. Three additional LCS ships were awarded in FY17. The Navy's Acquisition Strategy supports procurement of LCS ships from FY18 through FY19 as currently budgeted.											

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
E. Performance Metrics The LCS Program achieved Milestone A and Program Initiation in May 2004 and Milestone B in February 2011. The LCS program conducts annual Defense Acquisition Board In-Process Reviews (DAB IPRs). The first Seaframe and Mission Module integrated program DAB IPR was conducted in January 2013 and is held in September thereafter.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development Summary	Various	Various : Various	479.868	0.000		0.000		0.000		-		0.000	0.000	479.868	-
		Subtotal	479.868	0.000		0.000		0.000		-		0.000	0.000	479.868	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NSWC/DD : Dahlgren, VA	68.080	2.170	Sep 2017	2.023	Feb 2018	1.460	Nov 2018	-		1.460	1.292	75.025	-
Government Engineering Support	WR	NSWC/PC : Panama City, FL	27.987	0.000		0.000		0.000		-		0.000	0.000	27.987	-
Government Engineering Support	WR	NUWC/N : Newport, RI	9.859	0.180	Apr 2017	0.153	Nov 2017	0.110	Nov 2018	-		0.110	0.000	10.302	-
Government Engineering Support	WR	NAWC/AD : Pax River, MD	25.062	0.000		0.000		0.000		-		0.000	0.000	25.062	-
Government Engineering Support	WR	NSWC/CR : Crane, IN	17.722	0.000		0.000		0.000		-		0.000	0.000	17.722	-
Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	70.881	2.245	Feb 2018	1.906	Feb 2018	1.375	Nov 2018	-		1.375	0.941	77.348	-
Government Engineering Support	Various	Government Activities : Various	50.416	2.359	Jul 2017	2.000	Feb 2018	1.443	Nov 2018	-		1.443	1.136	57.354	-
Contractor Engineering Support	C/CPAF	Alion/CSC : Arlington, VA	49.802	0.000		0.000		0.000		-		0.000	0.000	49.802	-
Contractor Engineering Support	C/CPAF	Various : Various	20.617	2.198	Sep 2017	1.863	Feb 2018	1.344	Mar 2019	-		1.344	1.759	27.781	-
Government Engineering Support	WR	NSWC/CD : Bethesda, MD	4.643	5.470	Apr 2017	4.592	Feb 2018	2.131	Nov 2018	-		2.131	4.558	21.394	-
Government Engineering Support	WR	PEO IWS : Various	0.300	3.088	Jan 2017	2.613	Mar 2018	1.886	Dec 2018	-		1.886	2.310	10.197	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	WR	General Dynamics Bath Iron Works : Bath, ME	0.933	0.000		0.000		0.000		-		0.000	0.000	0.933	-
Condition Based Maintenance	WR	NSWC/PHD : Port Hueneme, CA	5.180	0.000		0.000		0.000		-		0.000	0.000	5.180	-
Government Engineering Support	WR	NSWC/PHD : Port Hueneme, CA	0.788	0.070	Apr 2017	0.059	Nov 2017	0.043	Nov 2018	-		0.043	0.000	0.960	-
Frigate Government Engineering Support	WR	NSWC/CD : Carderock, MD	1.179	0.000		0.000		0.000		-		0.000	0.000	1.179	-
Frigate Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	0.468	0.000		0.000		0.000		-		0.000	0.000	0.468	-
Frigate Contractor Engineering Support	C/CPAF	Alion : Arlington, VA	0.973	0.000		0.000		0.000		-		0.000	0.000	0.973	-
Frigate Contractor Engineering Support	C/CPAF	Booz Allen Hamilton : McLean, VA	0.345	0.000		0.000		0.000		-		0.000	0.000	0.345	-
Subtotal		355.235	17.780		15.209		9.792		-		9.792	11.996	410.012	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	C/CPAF	Alion/CSC : Arlington, VA	31.844	0.000		0.000		0.000		-		0.000	0.000	31.844	-
Test & Evaluation	WR	NSWC/PHD : Port Hueneme, CA	56.878	0.678	Apr 2017	0.416	Jan 2018	0.179	Nov 2018	-		0.179	0.751	58.902	-
Test & Evaluation	WR	NSWC/PD : Philadelphia, PA	65.428	0.916	Apr 2017	0.825	Nov 2017	0.000		-		0.000	0.000	67.169	-
Test & Evaluation	WR	NSWC/PC : Panama City, FL	16.414	0.059	Apr 2017	0.000		0.000		-		0.000	0.000	16.473	-
Test & Evaluation	WR	COMOPTEVFOR : Norfolk, VA	14.563	0.330	Apr 2017	0.000		0.757	Nov 2018	-		0.757	0.400	16.050	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP						Project (Number/Name) 3096 / Littoral Combat Ship					
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	WR	NSWC/COR : Corona, CA	17.746	0.440	Apr 2017	0.245	Nov 2017	0.106	Nov 2018	-		0.106	0.000	18.537	-
Test & Evaluation	WR	Government Activities : Various	70.872	0.194	Apr 2017	0.500	Nov 2017	0.216	Mar 2019	-		0.216	1.223	73.005	-
Test & Evaluation	C/CPAF	LM/GD/Austal : Various	78.326	1.850	Nov 2016	0.890	Jan 2018	0.000		-		0.000	0.000	81.066	-
Test & Evaluation	WR	PEO C4I : Charleston, SC	11.562	0.000		0.000		0.000		-		0.000	0.000	11.562	-
T&E Ordnance/ Ammunition	WR	PEO IWS : Various	21.902	0.642	Apr 2017	0.000		0.000		-		0.000	0.000	22.544	-
FSST Support	WR	NAVAIR : Patuxent River, MD	3.872	0.615	Jan 2017	0.000		0.000		-		0.000	0.000	4.487	-
Range Support	WR	NAWC/WD : Pt. Mugu, CA	2.693	0.775	Feb 2017	0.000		0.000		-		0.000	0.000	3.468	-
Test & Evaluation	WR	NSWC/CD : Bethesda, MD	16.142	3.716	Jan 2017	2.756	Feb 2018	1.170	Mar 2019	-		1.170	1.030	24.814	-
FSST Support	C/BA	National Science Foundation : Arlington, VA	2.321	0.350	Apr 2017	0.000		0.000		-		0.000	0.000	2.671	-
FSST Support	C/BA	NAVFAC Atlantic : Virginia Beach, VA	0.759	0.000		0.000		0.000		-		0.000	0.000	0.759	-
Test & Evaluation	C/BA	Naval Research Laboratory : Washington, DC	0.754	0.345	Apr 2017	0.000		0.000		-		0.000	0.000	1.099	-
Subtotal		412.076	10.910		5.632		2.428		-			2.428	3.404	434.450	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support- SEAPORT	C/CPAF	Alion/CSC : Arlington, VA	20.593	0.000		0.000		0.000		-		0.000	0.000	20.593	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	12.212	0.000		0.000		0.000		-		0.000	0.000	12.212	-
Subtotal		Subtotal	32.805	0.000		0.000		0.000		-		0.000	0.000	32.805	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			1,279.984	28.690		20.841		12.220		-		12.220	15.400	1,357.135	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603581N / (U)LITTORAL COMBAT
SHIP**Project (Number/Name)**

3096 / Littoral Combat Ship

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Proj 3096DDISAR: Detailed Design Integrated
Survivability Assessment Report -
Independence VariantDDISAR: Detailed Design Integrated
Survivability Assessment Report - Freedom
VariantLCS FSAR: LCS Final Survivability
Assessment ReportADT: Air Defense Testing for Self Defense
Test ShipADST in Support of PRA Testing: Air Defense
Seafame Testing - Independence VariantADG Degaussing: Advanced Degaussing
System - Freedom VariantAIMS Testing: Assessment and Identification
of Mine Susceptibility - Independence VariantAIMS Testing: Assessment and Identification
of Mine Susceptibility - Freedom VariantAMISS Testing: Advanced Mine Simulation
System - Independence VariantAMISS Testing: Advanced Mine Simulation
System - Freedom VariantVTUAV Dynamic Interface Testing: Vertical
Take-off and Landing Unmanned Aerial
Vehicle Dynamic Interface Testing -
Independence Variant

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018										
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								Project (Number/Name)												
1319 / 4					PE 0603581N / (U)LITTORAL COMBAT SHIP								3096 / Littoral Combat Ship												
					FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023								
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Freedom Variant																									
TECHEVAL SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Technical Evaluation - Freedom Variant																									
IOT&E SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Initial Operational Test and Evaluation - Freedom Variant																									
DT MCM TECHEVAL & IOT&E: Mine Countermeasure Mission Package Developmental Testing TECHEVAL (Phase I & II) & IOT&E - Independence Variant																									
DT SUW: Surface Warfare Developmental Test - Independence Variant																									
DT SUW: Surface Warfare Developmental Test - Phase I / Phase II- Freedom Variant																									
ASW DT: Anti-Submarine Warfare Developmental Test - Freedom Variant																									
ASW TECHEVAL: Anti-Submarine Warfare Technical Evaluation - Freedom Variant																									
ASW IOT&E: Anti-Submarine Warfare Mission Package Initial Operational Test and Evaluation - Freedom Variant																									
IOT&E VTUAV: Vertical Take-off and Landing Unmanned Aerial Vehicle Initial Operational Test and Evaluation - Independence Variant																									

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018											
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4								PE 0603581N / (U)LITTORAL COMBAT SHIP								3096 / Littoral Combat Ship											
								FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
								1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FSST Post Availability Report - LCS 5: Post Availability Report - Freedom Variant								[REDACTED]																			
FSST Post Availability Report - LCS 6: Post Availability Report - Independence Variant								[REDACTED]																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 3096 / Littoral Combat Ship

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3096				
DDISAR: Detailed Design Integrated Survivability Assessment Report - Independence Variant	1	2017	1	2018
DDISAR: Detailed Design Integrated Survivability Assessment Report - Freedom Variant	1	2017	1	2018
LCS FSAR: LCS Final Survivability Assessment Report	1	2017	1	2019
ADT: Air Defense Testing for Self Defense Test Ship	1	2017	3	2018
ADST in Support of PRA Testing: Air Defense Seafame Testing - Independence Variant	2	2018	3	2019
ADG Degaussing: Advanced Degaussing System - Freedom Variant	3	2018	3	2018
AIMS Testing: Assessment and Identification of Mine Susceptibility - Independence Variant	3	2018	3	2018
AIMS Testing: Assessment and Identification of Mine Susceptibility - Freedom Variant	3	2018	3	2018
AMISS Testing: Advanced Mine Simulation System - Independence Variant	3	2018	3	2018
AMISS Testing: Advanced Mine Simulation System - Freedom Variant	3	2018	3	2018
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Independence Variant	2	2017	2	2017
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Freedom Variant	1	2018	1	2018
TECHEVAL SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Technical Evaluation - Freedom Variant	1	2019	1	2019
IOT&E SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Initial Operational Test and Evaluation - Freedom Variant	1	2019	1	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 3096 / Littoral Combat Ship			
Events by Sub Project	Start		End		
	Quarter	Year	Quarter	Year	
	4	2019	4	2020	
	DT SUW: Surface Warfare Developmental Test - Independence Variant	3	2019	4	2019
	DT SUW: Surface Warfare Developmental Test - Phase I / Phase II- Freedom Variant	2	2018	1	2019
	ASW DT: Anti-Submarine Warfare Developmental Test - Freedom Variant	2	2019	2	2019
	ASW TECHEVAL: Anti-Submarine Warfare Technical Evaluation - Freedom Variant	3	2019	3	2019
	ASW IOT&E: Anti-Submarine Warfare Mission Package Initial Operational Test and Evaluation - Freedom Variant	4	2019	4	2019
	IOT&E VTUAV: Vertical Take-off and Landing Unmanned Aerial Vehicle Initial Operational Test and Evaluation - Independence Variant	1	2018	2	2018
FSST Post Availability Report - LCS 5: Post Availability Report - Freedom Variant	1	2017	2	2018	
FSST Post Availability Report - LCS 6: Post Availability Report - Independence Variant	1	2017	4	2018	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
4506: <i>LCS Training</i>	8.085	22.116	20.150	15.777	-	15.777	2.153	1.748	0.893	0.915	Continuing	Continuing			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-					
Project MDAP/MAIS Code: 374															
A. Mission Description and Budget Item Justification															
LCS is a minimally-manned ship, and the small crew. LCS uses a Train-to-Qualify (T2Q)/Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators and blended training solutions focused on tactical, equipment operations, and maintenance training. When completely developed and procured, the LCS shore-based training capability will satisfy individual, team, unit, and force training, with an objective of meeting Capability Development Document (CDD) T2Q/T2C Key Performance Parameter (KPP) requirements.															
RDT&E funds are used to develop advanced Immersive Virtual Ship Environment (IVSE), or Virtual Reality (VR) courseware and associated simulators to achieve the training objectives. Additionally, after fielding these systems and courseware, RDT&E funds will be utilized to upgrade training to maintain conformity with LCS configurations and approved operational technical manuals and procedures. RDT&E funds are also used to test and evaluate training devices to verify compliance with requirements.															
The FY 2019 funding request was reduced by \$2.208 million to account for the availability of prior year execution balances.															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: LCS Total System Training Architecture											22.116	20.150	15.777	0.000	15.777
Articles:											-	-	-	-	
FY 2018 Plans:															
FY18 funding provides for the development and testing of various training courseware to provide the fleet with these required training capabilities as LCS hull deliveries increase. RDT&E funding provides Naval Air Warfare Center Training Systems Division (NAWC TSD) program management oversight as the LCS Training System Executive Agent. Funding is provided to continue Phase I and II of the IVSE combat systems courseware development, begin IVSE Deck Courseware development and oversee performance of the development efforts, while providing additional support efforts to the LCS Fleet Introduction Program Office (PMS 505). This funding also supports continued NAVFAC efforts preparing for additional small ship homeports required by the Strategic Laydown plan.															
FY 2019 Base Plans:															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018							
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training							
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO				
FY19 funding provides for the development and testing of multiple training courseware to provide the fleet with these required training capabilities and LCS hull deliveries increase. RDT&E funding provides Naval Air Warfare Center Training Systems Division (NAWC TSD) program management oversight while they complete the development of LCS deck operations (both variants) and continue combat systems IVSE courseware and begins the development of the combat systems part task trainer. NAWC will start the development of the VTUAV visual display trainer, oversee performance of the development effort, while providing additional support efforts to the LCS Fleet Introduction Program Office (PMS 505). This funding also supports continued NAVFAC efforts preparing for additional small ship homeports required by the Strategic Laydown plan.															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: The decrease of \$4.373M from FY18 to FY19 is due to a \$0.303M rate/efficiency reduction, \$2.208M prior year under execution reduction and the completion of \$1.862M of Training Development and Courseware efforts, as both Phases will be completed within FY18.															
Accomplishments/Planned Programs Subtotals								22.116	20.150	15.777	0.000				
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• OPN/5664: Surface Training Equipment	87.714	83.022	230.425	-	230.425	120.574	102.596	70.083	69.408	Continuing	Continuing				
Remarks PEOLCS funding accounts for only a portion of the OPN/5664 Line.															
D. Acquisition Strategy Per the combined LCS Navy Training System Plan (NTSP), the LCS core crew training concept will meet Train to Qualify and Train to Certify requirements incrementally, with expected completion in FY20. In the interim, individual qualifications for LCS crew members will be accomplished through a combination of vendor training, existing Navy training, new LCS courses and trainers that are presently online, and Under Instruction (U/I) time aboard LCS ships, prior to reporting for duty. Shore-based training requirements cannot be fully met with the interim LCS training strategy. Full realization will be achieved with the completed standup of the San Diego LCS Training Facility (LTF), which includes the Integrated Tactical Trainers, Bridge, Readiness Control Officer (RCO), Combat Systems and Mission Package															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 4506 / LCS Training
Training System (MPTS) part-task trainers, the Common Mission Package Trainer (CMPT), Mission Bay trainer and Virtual Reality Labs to support the Train to Qualify operations and maintenance pipeline courses.		
E. Performance Metrics <p>T2Q will succeed and support mission accomplishment in the long run only if commanders have confidence that the output is valid, reliable, and standardized. To justify that confidence, training outcomes must mirror, and therefore predict, critical mission outcomes. To achieve that result a set of objective, performance-based measures, metrics, and standards is being developed for each watch station and billet requirement. For qualifications to be truly predictive, they must be guaranteed by the application of objective measures that vary little between evaluators. New courses such as the Surface Warfare Officers School (SWOS) LCS Officer of the Deck (OOD), Junior Officer of the Deck (JOOD) and the LCS Shore-Based Trainer Capstone courses have been designed to meet T2Q standards. Ultimately, success of the training acquisition strategy will be objectively validated by accomplishment of PQS by the sailors as determined by the IVSE and achievement of all requirements in the LCS Training Manual (TRAMAN) as assessed by LCS Squadrons and appropriate Afloat Training Groups (ATG).</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Deck/Mission Bay Courseware	C/FFP	Cubic : Orlando, FL	1.878	0.000		0.000		2.550	Nov 2018	-		2.550	0.000	4.428	-
Combat Systems Courseware	C/FFP	Cubic : Orlando, FL	0.000	14.200	Feb 2017	10.145	Nov 2017	7.316	Nov 2018	-		7.316	7.800	39.461	-
Eng. Training Coursware	C/FFP	Cubic : Orlando, FL	0.600	0.492	Oct 2016	0.000		0.000		-		0.000	0.000	1.092	-
Training Development - Support	WR	NAWC/TSD : Orlando, FL	4.547	3.203	Nov 2016	4.000	Nov 2017	0.587	Nov 2018	-		0.587	Continuing	Continuing	Continuing
VTUAV/MH60	C/FFP	TBD : TBD	0.000	0.000		0.000		1.000	Mar 2019	-		1.000	6.270	7.270	-
Combat System Part Task Trainer	C/FP	TBD : TBD	0.000	0.000		0.000		1.500	Mar 2019	-		1.500	0.000	1.500	-
Mission Bay Trainer	C/CPIAF	Cubic : Orlando, FL	0.000	0.822	Oct 2016	0.000		0.000		-		0.000	0.000	0.822	-
Subtotal			7.025	18.717		14.145		12.953		-		12.953	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Human Systems Integration	WR	NSWC, DD : Dahlgren Virginia	0.320	0.204	Nov 2016	0.180	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Information Assurance	WR	NSWC, DN : Dam Neck, VA	0.400	1.214	Nov 2016	1.500	Nov 2017	1.500	Nov 2018	-		1.500	Continuing	Continuing	Continuing
Training ISEA	WR	NSWC/PHD : Port Hueneme, CA	0.200	0.541	Nov 2016	0.500	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Warfare Center SME/ NAVFAC	WR	VARIOUS : VARIOUS	0.000	0.067	Mar 2017	0.170	Nov 2017	0.150	Nov 2018	-		0.150	Continuing	Continuing	Continuing
Subtotal			0.920	2.026		2.350		1.650		-		1.650	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Support	C/CPAF	Various : Various	0.140	1.373	Mar 2017	3.655	Mar 2018	1.174	Mar 2019	-		1.174	Continuing	Continuing	Continuing
		Subtotal	0.140	1.373		3.655		1.174		-		1.174	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
		Project Cost Totals	8.085	22.116		20.150		15.777		-		15.777	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

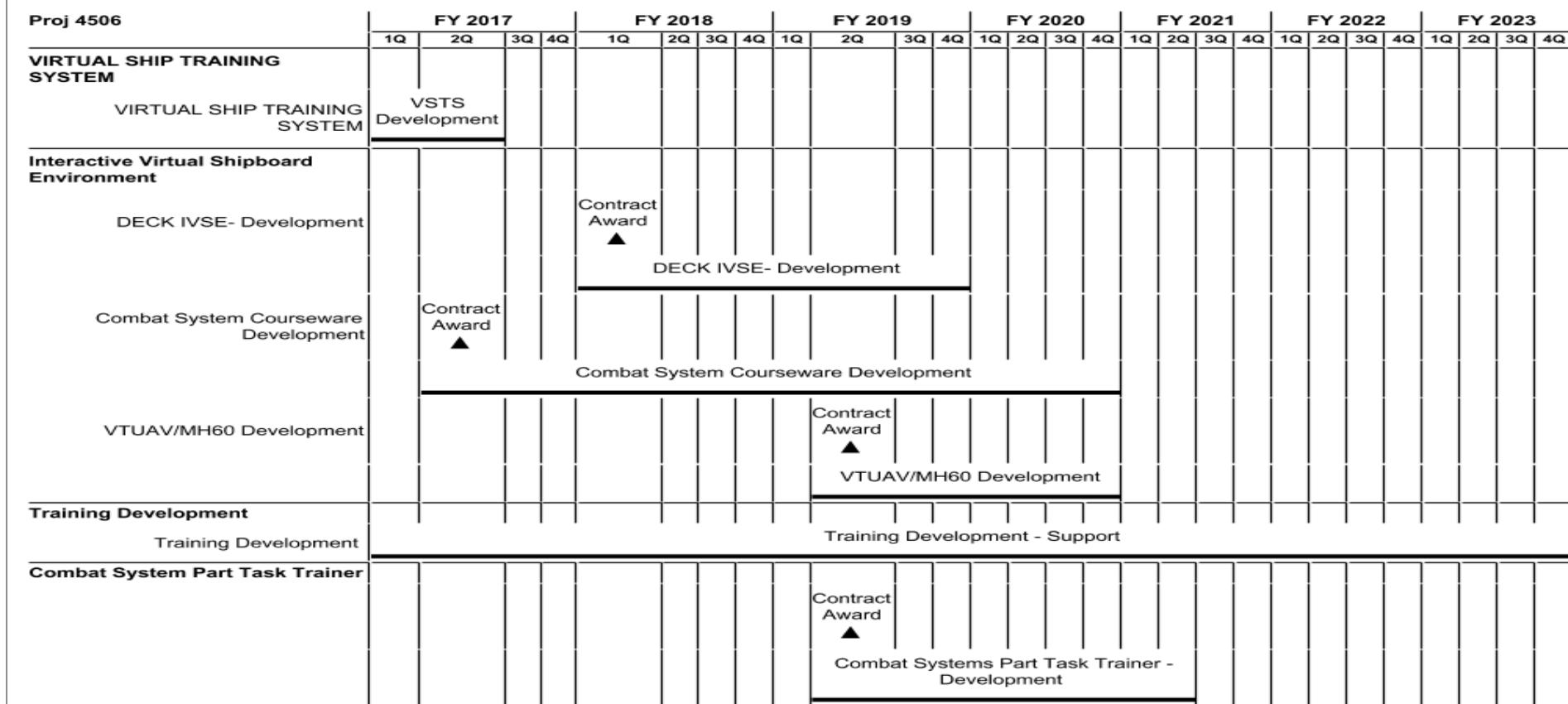
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603581N / (U)LITTORAL COMBAT
SHIP**Project (Number/Name)**

4506 / LCS Training



2019PB - 0603581N - 4506

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 4506 / LCS Training		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 4506</i>				
VIRTUAL SHIP TRAINING SYSTEM: VIRTUAL SHIP TRAINING SYSTEM: VSTS Development		1	2017	2
Interactive Virtual Shipboard Environment: DECK IVSE- Development: DECK IVSE Contract Award		1	2018	1
Interactive Virtual Shipboard Environment: DECK IVSE- Development: DECK IVSE- Development		1	2018	4
Interactive Virtual Shipboard Environment: Combat System Courseware Development: Combat System Courseware Contract Award		2	2017	2
Interactive Virtual Shipboard Environment: Combat System Courseware Development: Combat System Courseware Development		2	2017	4
Interactive Virtual Shipboard Environment: VTUAV/MH60 Development: VTUAV/MH60 Contract Award		2	2019	2
Interactive Virtual Shipboard Environment: VTUAV/MH60 Development: VTUAV/MH60 Development		2	2019	4
Training Development: Training Development: Training Development - Support		1	2017	4
Combat System Part Task Trainer: Combat Systems Part Task Trainer - Contract Award		2	2019	2
Combat System Part Task Trainer: Combat Systems Part Task Trainer - Development		2	2019	2

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603582N / Combat System Integration							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	384.945	23.839	24.674	16.351	-	16.351	27.921	16.015	15.509	26.496	Continuing	Continuing
0164: Combat System Integration	384.945	23.839	20.274	16.351	-	16.351	27.921	16.015	15.509	26.496	Continuing	Continuing
3425: Digital Warfare	0.000	0.000	4.400	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.400

A. Mission Description and Budget Item Justification

Beginning in PB 19, Proj 3425 Digital Warfare (DW)MBE&DT Development moved to new RDT&EN PE 0603017N.

Chief of Naval Operations (CNO) created the Navy's Strike Force Interoperability (SFI) Program in 1998 in response to critical shortfalls in the introduction of integrated and interoperable System of Systems (SoS) to deploying Strike Forces. Naval Sea Systems Command (NAVSEA) acts as management lead for Joint System Command (SYSCOM) system certification policy and guidance and certifies platforms for interoperability within the platform and throughout the enterprise, in accordance with Commander, US Fleet Forces Command/Commander, Pacific Fleet COMUSFLTFORCOM/COMPACFLT Inst. 4720.3B (OCT 2008), C5ISR Modernization Policy. COMUSFLTFORCOM/COMPACFLT Inst. 4720.3B also requires that NAVSEA act as administrative agent for NAVIFOR Command and Control, Communications, Computers, Combat Systems, and Intelligence Modernization Process (C5IMP) and execution agent for Navy Command and Control, Communications, Computers, and Combat Systems Integration (C5I) Modernization Conferences (NCMC). This program conducts Interoperability Assessments that are required to certify Aircraft Carriers, Amphibious Assault Ships, and Surface Combatants in accordance with the Naval Warfare System Certification Policy (NWSCP), NAVSEAINST 9410.2A, NAVAIR 5230.20, SPAWAR 5234.1.

The SFI Program ensures overall strike force interoperability is characterized and assessed. NAVSEA is assigned central United States Navy (USN) responsibility for interoperability, directing the development of policy and architecture for Strike Force warfare systems engineering and implementation of common warfare systems engineering processes and preliminary work to support the Digital Warfare (DW) mission area model based system engineering.

There are three priorities within the Strike Force Interoperability Program:

- (1) Support Fleet "as-is" state which includes Navigation System Certification (NAVCERT), Interoperability Capabilities & Limitations, and Interoperability Tactical Information Coordinator Technical Aids (TIC TECHAIDs).
- (2) Support Ship's system modernization (non-HME) including warfighting capability & other C5I upgrades including C5IMP Baseline Management.
- (3) Support Ship Warfare System Certification & Force Level Assessments. This includes Warfare Systems Certification, Interoperability Certification, Force Level Interoperability Analysis, & Assessments, Cybersecurity Assessments and recommendations for improvements to the program offices for implementation at the systems level.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>
Project 0164 Combat System Integration: This project consists of five key Pillars executed within the Strike Force Interoperability (SFI) Program:	
(1) Command & Control, Communications, Computer, Combat Systems, Intelligence, Surveillance and Reconnaissance (C5ISR) Modernization Process (C5IMP). The C5IMP validates the introduction of new systems into the fleet and ensures systems' maturity prior to shipboard installation thereby reducing risk and enhancing readiness and effectiveness of deploying ships and strike groups.	
(2) Warfare Systems Certification (WSCERT), which is essential to validating the maturity and operational performance of warfare systems prior to Fleet delivery and deployment.	
(3) The integrated Navigation System Certification (NAVCERT) program certifies the shipboard integrated navigation suite for safe navigation using the Electronic Charting and Display Information System Navy (ECDIS-N) as the primary plot. To support Strike Force Interoperability and ship's mission requirements, it ensures that the installed integration navigation suite provides accurate and timely navigation information (position, velocity, speed, heading, roll, and pitch) to all navigation data consumers. This supports the following mission critical functions: pre-launch aircraft alignment, safe aircraft precision approach and landing operations, and accurate warfare/weapon systems targeting.	
(4) Interoperability Certification and Assessment (IOP C&A), the independent assessment of strike group warfare systems operational performance. Interoperability assessment examines force level engagement threads, aircraft control, air battle management, and operational displays. Assessments of deploying ships in strike force configurations are accomplished through the use of the Navy's Distributed Integration and Interoperability Assessment Capability (DIIAC) which supports the Deputy Assistant Secretary of the Navy (DASN) "shift to the left" policy by providing early interoperability testing in the acquisition lifecycle. It is a Commander, U.S. Fleet Forces Command (CFFC) and Commander U.S. Pacific Fleet (COMPACFLT) requirement that all strike forces undergo interoperability assessment testing in the DIIAC prior to deployment. Interoperability certification results are used to develop fleet tactical tools (Capabilities & Limitations (C&L) documentation and Tactical Information Coordinator Technical Aids (TIC TECHAIDS)), that ensure that systems' operators understand the interoperability capabilities and limitations of their combat systems and have the watch station tools necessary for the execution of their tactical responsibilities.	
(5) Cybersecurity Certification and Assessment (CYBER C&A), the assessment of systems' cybersecurity, as directed by OPNAV memorandum 5400 Ser N2N6/4U1119089, including compliance with DODI 8500.01 for each warfare system element, identifies vulnerabilities at both the element, system and enclave levels, and assesses a ship's IT/IA Cybersecurity posture in support of Warfare Systems Certification IAW the NAVSEAINST 9410.2 (series). Assessments of deploying ships in strike force configurations for its Cybersafe Readiness are accomplished through the use of the Navy's USS Secure environment leveraging existing navy labs and DOD Cyber Ranges and Fleet exercises using the cyber table top technique, red team, blue team, and cyber specific metrics/measure analysis to evaluate the system's and enclaves' ability to protect, detect, react and response to achieve its warfare mission requirement. System commands and programs of record also use these cyber assessments to guide their development of specific procedures for immediate response to cyber threats while maintaining maximum operational effectiveness. The cyber assessment results and ship systems and enclaves response procedures are also used to develop Fleet Cyber Tactical Tools (Capabilities & Limitations (CC&L) documentation and Cyber Tactical Technical Aids (CYBER TECHAIDS)), to ensure that systems' operators understand the capabilities and limitations of their combat systems and have the watch station tools necessary for the execution of their tactical responsibilities under various cyber threat conditions.	

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>
<p>Project 3312 Maritime Theater Missile Defense Forum (MTMD):</p> <p>This project funds participation in Maritime Integrated Air and Missile Defense projects with other nations. Included is participation in the Maritime Missile Defense Projects Framework Memorandum of Understanding of 2004 (as amended 2009). Known as the Maritime Theater Missile Defense (MTMD) forum, it promotes interoperability with the Navies of ten participating nations (Australia, Canada, France, Germany, Italy, Netherlands, Norway, Spain, United Kingdom and the United States). This project funds participation in several Project Arrangements and includes maritime contribution to the NATO Active Layered Theater Ballistic Missile Defense (ALTBMD) project, now known as NATO Ballistic Missile Defense (BMD). Engineering analysis and recommendations from MTMD activities are provided to European, Pacific and Central Combatant Commands to influence present day operations. Specifically, the MTMD Forum is addressing challenges with "Maritime Allied Air Defense in Support of Ballistic Missile Defense Operations" that face the Combatant Commanders during present day operations.</p>	
<p>The MTMD forum provides protection against the proliferation of short, medium and long-range Ballistic Missile (BM) and Advanced Anti-Ship Cruise Missile (ASCM) threats through the creation of an interoperable sea-based Integrated Air and Missile Defense (IAMD) capability among coalition nations. This includes protection across the full spectrum of these threats through the enhanced utilization of existing sea-based systems to protect against current threats while progressively improving and developing systems and system-of- systems to effectively counter evolving threats.</p>	
<p>This project supports USN participation in several Maritime IAMD related Project Arrangements and Working Groups including:</p> <ul style="list-style-type: none">(1) Battle Management Command, Control, Communications, Computers, and Intelligence (BMC4I) to define and develop architectures as well as to perform engineering to address coalition capability gaps.(2) Modeling & Simulation (M&S) to establish and maintain a maritime coalition M&S testbed and to perform legacy and future systems simulation testing.(3) Coalition Distributed Engineering Plant (CDEP) to establish and maintain a maritime coalition Hardware-in-the-Loop Testbed and to conduct CDEP testing.(4) Open Architecture (OA) to develop Interface Standards and Data Models.(5) Test Planning and Execution (TPEX) to develop Test Plans, oversee exercise participation and conduct post event data analysis and reporting.(6) Operational Requirements (OR) to develop a Coalition Maritime Missile Defense Operational Concept Document and to identify operational constraints and tactical constructs surrounding coalition maritime missile defense activities.(7) Reciprocal Use of Test Facilities agreements with other nations to support Maritime IAMD and MTMD related demonstrations.	
<p>Starting in FY17 and through the out-years, the MTMD project moves to Program Element 0605853N under Project Unit 3312: MTMD-Maritime Theater Missile Defense Forum.</p>	

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603582N / Combat System Integration			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	26.530	24.674	26.110	-	26.110
Current President's Budget	23.839	24.674	16.351	-	16.351
Total Adjustments	-2.691	0.000	-9.759	-	-9.759
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.750	0.000			
• SBIR/STTR Transfer	-0.421	0.000			
• Program Adjustments	-3.000	0.000	-9.471	-	-9.471
• Rate/Misc Adjustments	0.000	0.000	-0.288	-	-0.288
• Congressional General Reductions	-0.020	-	-	-	-
Adjustments					
Change Summary Explanation					
Beginning in PB 19, Proj 3425 Digital Warfare (DW) moved to new RDT&EN PE 0603017N.					
The FY 2019 funding request in Proj 0164 was reduced by \$2.0 million to account for the availability of prior year execution balances.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 0164 / Combat System Integration			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0164: <i>Combat System Integration</i>	384.945	23.839	20.274	16.351	-	16.351	27.921	16.015	15.509	26.496	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 0164: Combat System Integration:

This project consists of five key Pillars executed within the Strike Force Interoperability (SFI) Program:

- (1) Command & Control, Communications, Computer, Combat Systems, Intelligence, Surveillance and Reconnaissance (C5ISR) Modernization Process (C5IMP). The C5IMP validates the introduction of new systems into the fleet and ensures systems' maturity prior to shipboard installation thereby reducing risk and enhancing readiness and effectiveness of deploying ships and strike groups.
- (2) Warfare Systems Certification (WSCERT), which is essential to validating the maturity and operational performance of warfare systems prior to Fleet delivery and deployment.
- (3) The integrated Navigation System Certification (NAVCERT) program certifies the shipboard integrated navigation suite for safe navigation using the Electronic Charting and Display Information System Navy (ECDIS-N) as the primary plot. To support Strike Force Interoperability and ship's mission requirements, it ensures that the installed integration navigation suite provides accurate and timely navigation information (position, velocity, speed, heading, roll, and pitch) to all navigation data consumers. This supports the following mission critical functions: pre-launch aircraft alignment, safe aircraft precision approach and landing operations, and accurate warfare/weapon systems targeting.
- (4) Interoperability Certification and Assessment (IOP C&A), the independent assessment of strike group warfare systems operational performance. Interoperability assessment examines force level engagement threads, aircraft control, air battle management, and operational displays. Assessments of deploying ships in strike force configurations are accomplished through the use of the Navy's Distributed Integration and Interoperability Assessment Capability (DIIAC) which supports the Deputy Assistant Secretary of the Navy (DASN) "shift to the left" policy by providing early interoperability testing in the acquisition lifecycle. It is a Commander, U.S. Fleet Forces Command (CFFC) and Commander U.S. Pacific Fleet (COMPACFLT) requirement that all strike forces undergo interoperability assessment testing in the DIIAC prior to deployment. Interoperability certification results are used to develop fleet tactical tools (Capabilities & Limitations (C&L) documentation and Tactical Information Coordinator Technical Aids (TIC TECHAIDS)), that ensure that systems' operators understand the interoperability capabilities and limitations of their combat systems and have the watch station tools necessary for the execution of their tactical responsibilities.
- (5) Cybersecurity Certification and Assessment (CYBER C&A), the assessment of systems' cybersecurity, as directed by OPNAV memorandum 5400 Ser N2N6/4U1119089, including compliance with DODI 8500.01 for each warfare system element, identifies vulnerabilities at both the element, system and enclave levels, and assesses a ship's IT/IA Cybersecurity posture in support of Warfare Systems Certification IAW the NAVSEAINST 9410.2 (series). Assessments of deploying

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration				
ships in strike force configurations for its Cybersafe Readiness are accomplished through the use of the Navy's USS Secure environment leveraging existing navy labs and DOD Cyber Ranges and Fleet exercises using the cyber table top technique, red team, blue team, and cyber specific metrics/measure analysis to evaluate the system's and enclaves' ability to detect, react and response to achieve its warfare mission requirement. System commands and programs of record also use these cyber assessments to guide their development of specific procedures for immediate response to cyber threats while maintaining maximum operational effectiveness. The cyber assessment results and ship systems and enclaves response procedures are also used to develop Fleet Cyber Tactical Tools (Capabilities & Limitations (CC&L) documentation and Cyber Tactical Technical Aids (CYBER TECHAIDS)), to ensure that systems' operators understand the capabilities and limitations of their combat systems and have the watch station tools necessary for the execution of their tactical responsibilities under various cyber threat conditions.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
Title: Navigation System Certification (NAVCERT)	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: The Navigation Certification (NAVCERT) program provides assurance to the ship, Immediate Superior in Command (ISIC) and Type Commander that the ship's integrated navigation suite operates as intended and meets performance requirements for safe navigation. The certification verifies the accuracy of the data originating from an array of sensors and validates its receipt by all users including Aircraft Inertial Alignment System and Integrated Warfare Systems. Certification is required at five-year intervals, following Chief of Naval Operations Availabilities greater than six months, or in support of Precision Approach and Landing System (PALS) operations. The scope of the certification includes all inertial navigation system equipment as well as the Electronic Chart Display and Information System - Navy (ECDIS- N). Forecasting the schedule for NAVCERT is based on the projection of schedule drivers (operational commitments, maintenance schedules) at the particular point in time. The scheduling realities associated with this process are such that in the face of frequent availability deferrals, cancellations, or delays, the supporting NAVCERT schedules adjust accordingly and those adjustments result in regular modifications to the numbers of certifications projected, period to period.		1.583	1.567	1.335	0.000	1.335
FY 2018 Plans: (1) Conduct 36 NAVCERTs on U.S. Navy Surface Combatants, Aircraft Carriers, and Amphibious Ships. Achieve cost efficiencies by leveraging test results from conjunctive alterations to navigation systems during modernization periods. This includes 10 certifications scheduled for FY17 either deferred to or completing in FY18.		-	-	-	-	-
FY 2019 Base Plans: (1) Conduct 18 scheduled NAVCERTs on Cruisers, Destroyers, Aircraft Carriers, and Amphibious Ships. Continue to achieve cost efficiencies by leveraging test results from conjunctive alterations to navigation systems during modernization						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
periods.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Reduction due to DON19 RDTEN Underexecution Review and Inflation Rate Change.					
Title: Command , Control, Communications, Computers, Combat Systems, Intelligence, Surveillance and Reconnaissance (C5ISR) Modernization Process (C5IMP)	2.003	2.506	2.093	0.000	2.093
Articles:	-	-	-	-	-
Description: This project is required to support the Fleet C5I Modernization Policy (per COMUSFLTFORCOM/ COMPACFLT Inst. 4720.3) to manage operational risks associated with C5ISR modernization in both afloat and ashore units in support of the Optimized Fleet Response Plan (OFRP), ensuring deploying units receive improved, interoperable, and certified warfighting capabilities in order to meet theater operational requirements. This project funds engineering assessments of proposed C5I capability modernizations to determine maturity for installation and risk associated with installs of equipment outside of normal modernization windows. The deliverables of this project are created by determining the maturity, through engineering analysis, of the critical linchpins needed to achieve interoperability for each proposed C5IMP capability improvement item to be installed in a ship's baseline, developing installation recommendations of C5I system upgrades for the Fleet Commanders, and researching and analyzing installation or operating problems. Failure to achieve required maturity for one system that is part of a warfare system package can prevent this system from being installed, thus breaking the capability planned for the entire original warfare package, which will impact Strike Group warfighting capabilities. There is close coordination with the FLTCDRs and TYCOMs as well as other members of the C5IMP community to address, coordinate, and resolve C5IMP modernization issues thereby reducing risk and enhancing readiness and effectiveness of deploying ships and strike groups. Focus is on key milestones) such as Baseline Locking Events (BLEs) and a Planned Not Authorized (PNA) reviews, and SG/ARG Analysis Reports which are Fleet required events. The BLEs, PNA Reviews, and SG/ARG Analysis Reports are the primary work products in the C5IMP process. Forecasting C5ISR requirements and schedules is based on the projection of ships' operating/maintenance schedules at the particular point in time. Due to changing operational needs, these schedules frequently change causing availability extensions, deferrals, cancellations, or delays. Also, the length of availabilities vary and often extend past fiscal years. The supporting C5IMP/C5ISR schedules must adjust accordingly, resulting in regular modifications to the numbers of events/requirements projected for C5IMP/C5ISR from period to period.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>		Project (Number/Name) 0164 / <i>Combat System Integration</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
FY 2018 Plans: (1) Facilitate reviews, assessments, and execution of C5I installations during approximately seventy-two (72) CNO Availabilities. (2) Support two (2) NCMCs (3) Support twelve (12) Monthly Baseline Events where sixty-three (63) Ship's Baselines will be reviewed and locked and twelve (12) PNA monthly PNA Review Meetings where the fifty-seven (57) PNAs will be completed. (4) Provide two (2) SG/ARG Analysis Reports. (Note: Due to existing funding shortfalls, no O-FRP products are currently planned to be produced.)							
FY 2019 Base Plans: (1) Facilitate reviews, assessments, and execution of C5I installations during approximately seventy-four (74) CNO Availabilities. (2) Support two (2) NCMCs (3) Support twelve (12) Monthly Baseline Locking Events where sixty-five (65) Ships' Baselines will be reviewed and locked and twelve (12) monthly PNA Review Meetings where the PNA status of forty-nine (49) Ships will be reviewed. (4) Provide two (2) SG/ARG Analysis Reports (Note: Due to existing funding shortfalls, no O-FRP products are currently planned to be produced.)							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Reduction due to DON19 RDTEN Underexecution Review and Inflation Rate Change.							
Title: Interoperability Certification and Assessment		Articles:	13.355	12.274	10.469	0.000	10.469
Description: This project funds interoperability assessments via the Distributed Integration & Interoperability Assessment Capability (DIIAC), the technical assessment of interoperable systems to meet mission requirements, the updating of Strike Group Capabilities and Limitations (C&L) and the updating of the Tactical Information Coordinator Technical Aids (TIC TECHAIDS). The project ensures NAVSEA/PEOs are delivering mature and interoperable warfare systems at the platform and Strike Group levels, with NAVSEA providing Strike Force interoperability certification and assessments. This project focuses on new systems and platforms under development. Interoperability Assessments of deploying ships in Strike Force configurations are accomplished through the utilization of the Navy's DIIAC, located at multiple Navy land-based sites located				-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
across the country and connected via networking technology, and that provides operational configurations for all naval combat systems. It is a U.S. Fleet Forces Command requirement that all Strike Forces undergo Interoperability Assessment Testing in the DIIAC prior to deployment. The DIIAC provides the only opportunity for comprehensive interoperability testing of combat system and C5I configuration items prior to shipboard delivery for operational use in surface combatant platforms and Strike Groups. DIIAC, with its ability to test systems in a Strike Group environment, is funded to support the warfare system's acquisition community to test their developmental items for interoperability. However, in this instance, while funds are provided to test the item in a Strike Group environment, funds are not provided for subsequent data analysis and risk assessment, as this is the cognizant acquisition program's responsibility. When the acquisition development is complete and corrections are made, DIIAC will then fund for the full interoperability certification testing of the baseline to include the requisite warfare system analysis and risk assessments needed to obtain an Interoperability Certification. Note, this effort also supports and feeds into the development of Fleet Tactical Tools such as Capabilities & Limitations (C&L) and Tactical Information Coordinator Technical Aids (TIC TECHAIDS), which ensure that operators understand the interoperability capabilities and limitations of their combat systems. C&Ls are published for all Strike Groups, Independent Deployers, and their Coalition and Joint partners. TIC TECHAIDS are delivered to deploying Strike Group ships prior to workups and then a final copy is provided prior to deployment. C&L and TIC TECHAIDS are the final report-out to Fleet operators of the acquisition community's efforts. They are used on a daily basis in every operational theater, as well as in every Navy and Joint Schoolhouse. Note, the DIIAC infrastructure is available, but not funded to support the surface Navy's participation in the Joint Testing Environments as well as the Maritime Theater Missile Defense (MTMD) Coalition Forces interoperability testing. This project also supports the stand-up and initial activities of the Digital Warfare (DW) to set Model Based Systems Engineering (MBSE) requirements, prioritize resources, and lead efforts on information interoperability and human/machine teaming.						
FY 2018 Plans: (1) Conduct two (2) Interoperability Land-Based test events including the following: -Development interoperability test to support for ACS 9.C2.0 (B24) ; ACS 9.A2.1 (B27) ; ACS 9.C2.1 (B27) ; AEGIS 5.4; SSDS 10.10.05 (CVN 78 Configuration) -Certification Interoperability test for ACS 9.A2.0A/9.A2.1B (B24) ; ACS 9.C2.0 (B24); ACS 9.A2.1 (B27) ; ACS 9.C2.1 (B27) -Certification Interoperability Risk assessment & Report for ACS ACS BL 9A2A/9A2B (B24) ; and SSDS 10.10.04 (LHD 2/CVN 72 Configuration) (2) Complete C&L, normally a near constant yearly demand requirement, also addressed AEGIS Ashore. This will result in updates to Interoperability C&L for:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>	Project (Number/Name) 0164 / <i>Combat System Integration</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>-Twenty-Three (23) Deploying Strike Group Ships (from a database containing 179 U.S. Surface Ships), -Ten (10) Naval Air Squadrons (covering F/A-18s, F-35, E-2Cs, E-2Ds, MH-60Ss, MH-60Rs, EA-6Bs, EA-18Gs, P-3Cs and P-8As), -AEGIS Ashore (Romania(update), Poland(initial) and Pacific Missile Range Facility (initial)). (3) Provide annual deliveries of Initial/Draft/Final TIC TECHAIDS to: -Four (4) Carrier Strike Groups (CSG's) Twenty Two (22) Ships -Three (3) Amphibious Ready Group's (ARG's) Six (6) Ships -Thirty (30) BMD Ships -Fourteen (14) Forward Deployed Naval Force (FDNF) Ships - Forty Nine (49) Independent Deployers (CVN, CG, DDG, LCC and LCS) -Aegis Ashore Site (Romania) -Four (4) Fleet Area Control and Surveillance Facilities (FACSFAC's) -Six (6) Fleet Maritime Operations Centers (MOC's) sites. (4) Plan to conduct engineering to support two (2) systems Verification and Validation Tests.</p> <p>FY 2019 Base Plans:</p> <p>1) Conduct three (3) Interoperability Land-Based test events including the following: -Development interoperability test to support for ACS 9.C2.2 (B30), SSDS 10.10.05 (CVN 78 Configuration), DDG 1000 (B8.5) -Certification Interoperability test for ACS 9.C2.1 (B27), ACS 9.A2.1 (B27), AEGIS 5.4, LCS Freedom BL 3.2, DDG 1000 (B8.5) -Certification Interoperability Risk assessment & Report for ACS 9.C2.0 (B24) and LCS Independence 6.X (2) Complete C&L and TIC TECHAIDS, normally a near constant yearly demand requirement, also addressed AEGIS Ashore. This will result in updates to Interoperability C&L for: -Twenty three (23) Deploying Strike Group Ships (from a database containing 185 U.S. Surface Ships), -Ten (10) Naval Air Squadrons (covering F/A-18s, F-35, E-2Cs, E-2Ds, MH-60Ss, MH-60Rs, EA-6Bs, EA-18Gs, P-3Cs and P-8As), -AEGIS Ashore (Romania, Poland(update) and Pacific Missile Range Facility(update)). (3) Provide annual deliveries of Initial/Draft/Final TIC TECHAIDS to: -Three (3) Carrier Strike Groups (CSG's) Sixteen (16) Ships -Four (4) Amphibious Ready Group's (ARG's) Eight (8) Ships</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>	Project (Number/Name) 0164 / <i>Combat System Integration</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>-Thirty-One (31) BMD Ships -Fourteen (14) Forward Deployed Naval Force (FDNF) Ships - Fifty-Three (53) Independent Deploying Ships (CVN, CG, DDG, LCCS and LCS) -Aegis Ashore Site (Romania) -Four (4) Fleet Area Control and Surveillance Facilities (FACSFAC's) -Six (6) Fleet Maritime Operations Centers (MOC's) sites. (4) Plan to conduct engineering to support two (2) systems Verification and Validation Tests.</p>						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Reduction due to DON 19 RDTEN Underexecution Review and Purchase Inflation Rate Change.						
Title: Warfare Systems Certification		Articles:	4.019	2.954	2.454	0.000
<p>Description: This project funds the conduct of Warfare Systems Certifications against set evaluation criteria. The project includes providing operational risk assessments, using Objective Quality Evidence (OQE), to ensure installation readiness and deployment readiness of warfare systems and Navy surface ships. NAVSEA accomplishes these efforts through Warfare System Certification Plans (WSCP), Warfare Systems Certification Readiness Reviews (WSCRR), Warfare Systems Installation Assessment (WSIA), and Warfare Systems Certification Decisions (WSCD) to support the installation and deployment of warfare systems in Navy surface platforms. This also ensures that aggregate deficiencies and workarounds do not render the operator ineffective by conducting an analysis of all work-arounds documented in Tactics, Techniques, and Procedures (TTPs), Capabilities & Limitations (C&L), and Trouble Reports (TR).</p>			-	-	-	-
FY 2018 Plans: (1) Conduct Warfare Systems Certifications for subset of the twenty (20) criteria for one hundred one (101) ships efforts for approximately one hundred sixty three (157) Warfare Systems Certification Events (WSCRRs, WSIA, and WSCDs) and fifty six (50) WSCPs for above ship classes. (2) Achieve significant WSCERT execution efficiencies through workforce streamlining initiatives related to WSCERT, criteria management and consolidation of WSCERT events. The program will be able to achieve significant WSCERT execution efficiencies thereby enabling completion of more events per investment dollar.						
FY 2019 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>	Project (Number/Name) 0164 / <i>Combat System Integration</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
(1) Conduct Warfare Systems Certifications Events for a subset of twenty (20) criteria for one hundred one (101) ships efforts for approximately one hundred sixty three (163) Warfare Systems Certification Events (WSCRRs, WSIAs, and WSCDs) and fifty six (56) WSCPs for above ship classes.						
(2) Update the NWSCP and implement revised Naval Warfare Systems Certification Policy.						
(3) Continue to achieve significant WSCERT execution efficiencies through workforce streamlining initiatives related to WSCERT Criteria management and consolidation of WSCERT events thereby enabling completion of more events per investment dollar, thereby enabling sustainment of certification requirements amidst a shrinking budget.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Reduction due to DON19 RDTEN Underexecution Review and Inflation Rate Change.						
Title: Warfare Systems Cybersecurity	Articles:	2.879	0.973	0.000	0.000	0.000
Description: The required assessment and characterization of aggregate levels of risk for ships is specified to be accomplished at the Warfare Systems System of Systems (SoS) level and will be part of the requirements identified in the Naval Warfare Systems Certification of Navy Aircraft Carriers and Surface Combatants. Cybersecurity assessment activities began FY16.		-	-	-	-	-
Cybersecurity Assessment at the SoS level will entail:						
(1) Establishing and collecting metrics to characterize Warfare Systems ability to protect, detect, react, and restore capabilities, as well as analyze the mission effects induced by the cyber threat activity.						
(2) Maintain, improve and refine the methodologies, tools, and techniques used to conduct such risk assessments appropriate to ship warfare systems baselines and representative strike group interoperability requirements.						
(3) Conduct an assessment of developmental and operational warfare systems.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018																										
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 0164 / Combat System Integration																											
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total																									
FY 2018 Plans: (1) Develop performance metrics for both Cyber PROTECT and RECOVER requirements. (2) Conduct Cybersecurity Assessments on Thirty (30) Ships. (3) Develop CYBER TECHADS for Thirty-Three (33) Ships. (4) Develop CYBER CAPS&LIMS for Thirty-Three (33) Ships.																																		
FY 2019 Base Plans: N/A																																		
FY 2019 OCO Plans: N/A																																		
FY 2018 to FY 2019 Increase/Decrease Statement: Reduction due to DON19 RDTEN Underexecution Review and Inflation Rate Change.																																		
Accomplishments/Planned Programs Subtotals					23.839	20.274	16.351	0.000	16.351																									
C. Other Program Funding Summary (\$ in Millions) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Line Item</th> <th style="text-align: center;">FY 2017</th> <th style="text-align: center;">FY 2018</th> <th style="text-align: center;">FY 2019 Base</th> <th style="text-align: center;">FY 2019 OCO</th> <th style="text-align: center;">FY 2019 Total</th> <th style="text-align: center;">FY 2020</th> <th style="text-align: center;">FY 2021</th> <th style="text-align: center;">FY 2022</th> <th style="text-align: center;">FY 2023</th> <th style="text-align: center;">Cost To Complete</th> <th style="text-align: center;">Total Cost</th> </tr> </thead> <tbody> <tr> <td>• OPN 2960: ICSTF: Integrated Combat System Test Facility</td> <td style="text-align: center;">8.376</td> <td style="text-align: center;">5.019</td> <td style="text-align: center;">6.251</td> <td style="text-align: center;">-</td> <td style="text-align: center;">6.251</td> <td style="text-align: center;">6.167</td> <td style="text-align: center;">5.981</td> <td style="text-align: center;">6.135</td> <td style="text-align: center;">6.276</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">79.751</td> </tr> </tbody> </table>											Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	• OPN 2960: ICSTF: Integrated Combat System Test Facility	8.376	5.019	6.251	-	6.251	6.167	5.981	6.135	6.276	0.000	79.751
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost																							
• OPN 2960: ICSTF: Integrated Combat System Test Facility	8.376	5.019	6.251	-	6.251	6.167	5.981	6.135	6.276	0.000	79.751																							
Remarks																																		
D. Acquisition Strategy RDTEN funding under this line supports independent certification of the integration of major capability upgrades acquired by Program Executive Offices (PEOs) into host Navy Platforms and Strike Forces. The RDTEN engineering and certification activities at field sites do not involve direct procurement of equipment or engineering services, and hence no acquisition strategy is required. The major capability upgrades evaluated under this program fall under their associated PEOs' acquisition strategies.																																		
E. Performance Metrics Quarterly Program Reviews and Baseline Assessments																																		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 0164 / Combat System Integration							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SF Requirements Engineering & Analysis	WR	NSWCs : DN/PHD/ Corona	5.157	0.000		0.000		0.000		-		0.000	0.000	5.157	-	
SF Requirements Engineering & Analysis	WR	Non-NSWCs : Various	5.295	0.000		0.000		0.000		-		0.000	0.000	5.295	-	
Platform/Strike Force Certification	WR	NSWCs : DD/ICSTD/ DN/Corona	39.732	0.000		0.000		0.000		-		0.000	0.000	39.732	-	
Platform/Strike Force Certification	WR	Non-NSWCs : Various	27.843	0.000		0.000		0.000		-		0.000	0.000	27.843	-	
Fleet Response Plan (FRP)	WR	NSWCs : DD/PHD/ DN	27.030	0.000		0.000		0.000		-		0.000	0.000	27.030	-	
Fleet Response Plan (FRP)	WR	Non-NSWCs : Various	3.793	0.000		0.000		0.000		-		0.000	0.000	3.793	-	
Combat Systems Cert ISO Platform Cert	WR	NSWCs : DN/DD/ PHD/Corona	24.640	0.000		0.000		0.000		-		0.000	0.000	24.640	-	
Combat Systems Cert ISO Platform Cert	WR	Non-NSWCs : Various	1.853	0.000		0.000		0.000		-		0.000	0.000	1.853	-	
C5IMP & Fleet Readiness	WR	NSWCs : PHD	9.010	3.252	Nov 2016	3.036	Nov 2017	2.700	Nov 2018	-		2.700	Continuing	Continuing	Continuing	
C5IMP & Fleet Readiness	C/CPFF	Non-NSWCs : Various	0.000	0.000		0.240	Dec 2017	0.209	Dec 2018	-		0.209	0.000	0.449	-	
Warfare Systems Certification	WR	NSWCs : DD/Crane	17.413	0.719	Nov 2016	0.671	Nov 2017	0.308	Nov 2018	-		0.308	Continuing	Continuing	Continuing	
Warfare Systems Certification	WR	Non-NSWCs : Various	3.500	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
CNI/Design Agent	SS/CPAF	General Dynamics : Not Specified	47.926	0.000		0.000		0.000		-		0.000	0.000	47.926	-	
CNI/Software Engineering	WR	NSWC : Dahlgren	8.383	0.000		0.000		0.000		-		0.000	0.000	8.383	-	
CNI/Test and Evaluation	WR	CDS : Not Specified	3.922	0.000		0.000		0.000		-		0.000	0.000	3.922	-	
CNI/Systems Engineering	WR	NSWC : PHD	2.645	0.000		0.000		0.000		-		0.000	0.000	2.645	-	
CNI/Miscellaneous	WR	Various : Not Specified	7.529	0.000		0.000		0.000		-		0.000	0.000	7.529	-	
OA Automated Test and Retest	WR	NSWCs : Various	17.500	0.000		0.000		0.000		-		0.000	0.000	17.500	-	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 0164 / Combat System Integration								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Contract Engineering Support	C/CPFF	Gryphon Technology : VA	30.891	5.093	Jan 2017	5.034	Jan 2018	4.410	Jan 2019	-		4.410	Continuing	Continuing	Continuing	
Contract Program Management Support	C/CPFF	Delta Resources Inc. : VA	8.141	0.000		0.000		0.000		-		0.000	0.000	8.141	-	
Travel	Allot	NAVSEA HQ : Washington, DC	2.330	0.021	Jan 2017	0.020	Jan 2018	0.019	Jan 2019	-		0.019	0.000	2.390	-	
Interoperability Fixes	WR	NSWCs : Various	1.500	0.000		0.000		0.000		-		0.000	0.000	1.500	-	
TIC TECHAIDS	WR	CSC : VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
Warfare Systems Cybersecurity	WR	NSWCs : PHD, Dahlgren & Corona	2.456	1.979	Jan 2017	0.973	Jan 2018	0.000	Jan 2019	-		0.000	0.000	5.408	-	
Capabilities & Limitations	WR	NSWCs : PHD	5.292	3.332	Nov 2016	3.110	Nov 2017	2.642	Nov 2018	-		2.642	0.000	14.376	-	
Cybersecurity IA	C/CPFF	CSC : VA	0.544	0.000		0.000		0.000		-		0.000	0.000	0.544	-	
Subtotal		304.325	14.396		13.084		10.288		-			10.288	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Combat System Integration Testing (CSIT)	WR	NSWCs : DD/ICSTF	5.736	0.000		0.000		0.000		-		0.000	0.000	5.736	-	
Interoperability Certification Assessment	WR	NSWCs : DD/ SPAWAR/San Diego	26.804	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
Navigation System Certification	WR	SPAWAR : Charleston, SC	9.257	1.657	Nov 2016	1.547	Nov 2017	1.282	Nov 2018	-		1.282	0.000	13.743	-	
DIIAC Engineering and Operations	WR	NSWCs : DD/DN/ SPAWAR	20.323	1.496	Jan 2017	2.050	Jan 2018	1.779	Jan 2019	-		1.779	Continuing	Continuing	Continuing	
DEP Engineering and Operations	WR	NSWCs : Various	12.623	0.000		0.000		0.000		-		0.000	0.000	12.623	-	
Interoperability Cert Assessment	WR	NSWCs : DD/DN/ Corona	4.159	2.024	Nov 2016	2.542	Nov 2017	2.058	Nov 2018	-		2.058	0.000	10.783	-	
Interoperability Cert Assessment	C/CPFF	Non-NSWCS : CNA	1.249	1.268	Jan 2017	0.764	Jan 2018	0.730	Jan 2019	-		0.730	0.000	4.011	-	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 0164 / Combat System Integration							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Interoperability Cert Assessment	C/CPFF	CSC : Washington, DC	0.469	0.307	Jan 2017	0.287	Jan 2018	0.214	Jan 2019	-		0.214	0.000	1.277	-
Interoperability Cert Assessment	WR	NUWCs : Keyport	0.000	1.268	Jun 2017	0.000	Jun 2018	0.000	Jun 2019	-		0.000	0.000	1.268	-
Interoperability Cert Assessment	WR	NSWCs : Crane/ Dahlgren	0.000	0.771	Jun 2017	0.000	Jun 2018	0.000	Jun 2019	-		0.000	0.000	0.771	-
Interoperability Cert Assessment	C/CPFF	Various : Various	0.000	0.652	Sep 2017	0.000	Sep 2018	0.000	Sep 2019	-		0.000	0.000	0.652	-
Subtotal			80.620	9.443		7.190		6.063		-		6.063	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			384.945	23.839		20.274		16.351		-		16.351	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603582N / Combat System Integration

Project (Number/Name)

0164 / Combat System Integration

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
COMBAT SYSTEM INTEGRATION																														
NAVCERT: FY17 NAVCERTs (CG 67, CG 71, CVN 68, DDG 69, DDG 89)	[REDACTED]																													
NAVCERT: FY17 NAVCERTs (CG 54, CG 66, DDG 62, DDG 79, DDG 88 ,DDG 97, LPD 19, LPD 21, LPD 23, LPD 24, MCM 8)	[REDACTED]																													
NAVCERT: FY17 NAVCERT (CG 60, CVN 71, CVN 76, DDG 96, DDG 99, LCS 2, LHD 1, LHD 3, MCM 12)	[REDACTED]																													
NAVCERT: FY17 NAVCERT (CG 53, CVN 74, CVN 75, DDG 65, DDG 81, DDG 84, DDG 93, DDG 101, DDG 106, ,LHD 2, MCM 6, MCM 10)	[REDACTED]																													
NAVCERT: FY18 NAVCERT (CG 62, DDG 53, DDG, 59 , DDG 64, DDG 110, DDG 112, LCC 20, LCS 1, LCS 3, LSD 41, LSD 45, LSD 49)	[REDACTED]																													
NAVCERT: FY18 NAVCERT (DDG 75, DDG 76, DDG 85, DDG 87, LCC 19, LHD 4 ,LPD 26, LSD 41, LSD 49)	[REDACTED]																													
NAVCERT: FY18 NAVCERT (CG 56, CVN 69, DDG 55, DDG 81, DDG 82, DDG 94, LPD 17,LPD 18 , LPD 25)	[REDACTED]																													
NAVCERT: FY18 NAVCERT (DDG 52, DDG 71, DDG 85, DDG 91, DDG 100, LHD 8, LPD 19, MCM 4)	[REDACTED]																													
NAVCERT: FY19 NAVCERTs (CG 58, CVN 71, DDG 78, DDG 100, LHA 6, LPD 22)	[REDACTED]																													
NAVCERT: FY19 NAVCERTs (LPD 22, LHA 6, DDG 105, DDG 103)	[REDACTED]																													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603582N / Combat System Integration

Project (Number/Name)

0164 / Combat System Integration

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
NAVCERT: FY19 NAVCERTs (CVN 68, DDG 52, DDG 78, MCM 3, MCM 9, LHD 7, DDG 90)																														
NAVCERT: FY19 NAVCERTs (LSD 52, LPD 21, LHD 6, LSD 50, LHD 2, DDG 68, DDG 54, CVN 77 , MCM 8)																														
NAVCERT: FY20 NAVCERTs (CG 59, CVN 75, DDG 55, DDG 59, DDG 65. DDG 107, DDG 108)																														
NAVCERT: FY20 NAVCERTs (LHD 3, LPD 23, LSD 49, MCM 11, MCM 14)																														
NAVCERT: FY20 NAVCERTs (LHD 1, LPD 23)																														
NAVCERT: FY20 NAVCERTs (CVN 69, CVN 78, DDG 107, LHD 3)																														
NAVCERT: FY21 NAVCERTs (CVN 72, DDG 55, LCS 2, LHD 5, LPD 17, LPD 18, MCM 11)																														
NAVCERT: FY21 NAVCERTs (CG 55, CG 57, DDG 104, DDG 109, LCS 4, LHD 4, LHD 8, LPD 19, LPD 25, LPD 26 LSD 44, LSD 51. LSD 52, MCM 4)																														
NAVCERT: FY21 NAVCERTs (DDG 56, DDG 95, DDG 111, LCS 5, LCS 6, PC 2, PC 3, PC 5, PC 11)																														
NAVCERT: FY21 NAVCERTs (CVN 78, DDG 57,DDG 65, DDG 98, LCS 7, LCS 8, LCS 9)																														
NAVCERT: FY22 NAVCERTs (CG 54, CG 60. DDG 88, LPD 23, MCM 12, CVN 7, DDG 79, DDG 81, DDG 112)																														

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration								Project (Number/Name) 0164 / Combat System Integration										
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
NAVCERT: FY22 NAVCERTs (CVN 74, DDG 96, DDG 59, DDG 84, DDG, 99, LHD 3, LPD 24)																						
NAVCERT: FY22 NAVCERTs (CVN 74, CVN 75, CVN 76, DDG 93, LHD 1, LHD 2, MCM 4, MCM 6, MCM 10)																						
NAVCERT: FY22 NAVCERT (CG 62, DDG 53, DDG 82, DDG 101, DDG 106, DDG 110, LCC 19, LCS 3, LHD 4, CVN 71, DDG 63, 99, LPD 17 , LPD 21, PC 14)																						
NAVCERT: FY23 NAVCERT (LHD 3, LHD 4, LPD 18)																						
NAVCERT: FY23 NAVCERT (CG 60, CVN 78, DDG 55, DDG 61, LPD 21)																						
NAVCERT: FY23 NAVCERT (LHD 2, LPD 23, LSD 41)																						
NAVCERT: FY23 NAVCERT (CG 66, CG 70, LCS 8, LHA 7, LSD 43)																						
C5IMP: FY17 C5IMP Monthly Baseline (12/Year) (63 BLs planned)																						
C5IMP: FY17 NCMC - 1																						
C5IMP: FY17 NCMC - 2																						
C5IMP: FY17 SG/ARG Analysis Report (2/Year -Presented at NCMC)																						
C5IMP: FY17 PNA Reviews (12/Year) (Supports Approx 71 ship availabilities with total 11 PNAs planned)																						
C5IMP: FY18 C5IMP Monthly Baseline (12/Year) (63 BLs planned)																						
C5IMP: FY18 NCMC - 1																						

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018							
Appropriation/Budget Activity				R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4				PE 0603582N / Combat System Integration								0164 / Combat System Integration											
				FY 2017				FY 2018				FY 2019				FY 2020							
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
C5IMP: FY18 NCMC - 2																							
C5IMP: FY18 SG/ARG Analysis Report (2/Year -Presented at NCMC)																							
C5IMP: FY18 PNA Reviews (12/Year) (Supports Approx 72 ship availabilities with total 57 PNAs planned)																							
C5IMP: FY19 C5IMP Monthly Baseline (12/Year)																							
C5IMP: FY19 NCMC - 1																							
C5IMP: FY19 NCMC - 2																							
C5IMP: FY19 SG/ARG Analysis Report (2/Year - Presented at NCMC)																							
C5IMP: FY19 PNA Reviews (12/Year) (Supports Approx 74 ship availabilities with total 49 PNAs planned)																							
C5IMP: FY20 C5IMP Monthly Baseline (12/Year)																							
C5IMP: FY20 NCMC - 1																							
C5IMP: FY20 NCMC - 2																							
C5IMP: FY20 SG/ARG Analysis Report (2/Year - Presented at NCMC)																							
C5IMP: FY20 PNA Reviews (12/Year) (70 Ships)																							
C5IMP: FY21 C5IMP Monthly Baseline (12/Year)																							
C5IMP: FY21 NCMC - 1																							
C5IMP: FY21 NCMC - 2																							
C5IMP: FY21 SG/ARG Analysis Report (2/Year - Presented at NCMC)																							

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018					
Appropriation/Budget Activity						R-1 Program Element (Number/Name)						Project (Number/Name)											
1319 / 4						PE 0603582N / Combat System Integration						0164 / Combat System Integration											
						FY 2017						FY 2018						FY 2019					
						1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
C5IMP: FY21 PNA Reviews (12/Year) (69 Ships)																							
C5IMP: FY22 C5IMP Monthly Baseline (12/Year)																							
C5IMP: FY22 NCMC - 1																							
C5IMP: FY22 NCMC - 2																							
C5IMP: FY22 SG/ARG Analysis Report (2/Year - Presented at NCMC)																							
C5IMP: FY22 PNA Reviews (12/Year) (69 ships)																							
C5IMP: FY23 C5IMP Monthly Baseline (12/Year)																							
C5IMP: FY23 NCMC - 1																							
C5IMP: FY23 NCMC - 2																							
C5IMP: FY23 SG/ARG Analysis Report (2/Year - Presented at NCMC)																							
C5IMP: FY23 PNA Reviews (12/Year) (69 Ships)																							
Interoperability Certification & Assessments: FY17 BL 9C2 Interoperability Certification/ Development Tests (17-1): SSDS 10.10.02, AEGIS B/L 9A2 (Build 22); SSDS 9.08.05, LCS Freedom 3.1																							
Interoperability Certification & Assessments: FY17 Interoperability Certification/ Development Tests (17-2): AEGIS B/L 9C2.0 (Build 24), SSDS 10.10.04 (LHD 2,CVN72), LCS Independence 6.1, SSDS 10.1																							
Interoperability Certification & Assessments: FY17 Interoperability Certification/																							

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018							
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration								Project (Number/Name) 0164 / Combat System Integration											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Development Tests (17-3): SSDS 10.10.05, LCS 3.1, AEGIS B/L 9A2.0/9C2.0 (Build 24)																								
Interoperability Certification & Assessments: FY18 Interoperability Certification/ Developmental Tests (18-1): SSDS 10.10.05, AEGIS B/L 9C2.0 (Build 24)																								
Interoperability Certification & Assessments: Interoperability Certification & Assessments: FY18 Interoperability Certification/ Developmental Tests (18-2): AEGIS B/L 9A2.1/9C2.1 (Build 27); AE																								
Interoperability Certification & Assessments: FY18 Interoperability Certification/ Developmental Tests (18-3): AEGIS B/L 9A2.1/9C2.1 (Build 27), AEGIS 5.4; LCS Independence 6.X																								
Interoperability Certification & Assessments: FY19 Interoperability Development/ Certification Test (19-1): DDG1000 (Build 8.4)																								
Interoperability Certification & Assessments: FY19 Interoperability Development/ Certification Test (19-2): AEGIS B/L 9A2.1/9C2.1 (Build 27); AEGIS 5.4																								
Interoperability Certification & Assessments: FY19 Interoperability Development/ Certification Test (19-3): AEGIS B/L 9C2.2 (Build 30); DDG1000 (Build 8.4)																								
Interoperability Certification & Assessments: FY19 TBD Interoperability Development/ Certification Test (19-4): AEGIS B/L 9A2.2 (Build 30)																								

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018							
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration								Project (Number/Name) 0164 / Combat System Integration											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interoperability Certification & Assessments: FY20 Interoperability Development/ Certification Test (20-1): AEGIS B/L 9A2.2/9C2.2 (Build 30); SSDS 11.X																								
Interoperability Certification & Assessments: FY20 Interoperability Development/ Certification Test (20-2): SSDS B/L 11.X (ACB 20)																								
Interoperability Certification & Assessments: FY20 Interoperability Development/ Certification Test (20-3): AEGIS B/L 9A2.2/9C2.2 (Build 30); SSDS B/L 11.X																								
Interoperability Certification & Assessments: FY20 Interoperability Development/ Certification Test (20-4): SSDS B/L 11.X (ACB 20)																								
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-1)																								
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-2)																								
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-3)																								
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-4)																								
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-1)																								

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018							
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration								Project (Number/Name) 0164 / Combat System Integration											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-2)																					[REDACTED]			
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-3)																					[REDACTED]			
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-4)																					[REDACTED]			
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-1)																					[REDACTED]			
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-2)																					[REDACTED]			
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-3)																					[REDACTED]			
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-4)																					[REDACTED]			
Warfare Systems Certification: FY17 Warfare Systems Cert (145 Certification Events + 50 WSCPs)																					[REDACTED]			
Warfare Systems Certification: FY18 Warfare Systems Cert (157 Certification Events + 56 WSCPs)																					[REDACTED]			
Warfare Systems Certification: FY19 Warfare Systems Cert (163 Certification Events + 56 WSCPs)																					[REDACTED]			

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration								Project (Number/Name) 0164 / Combat System Integration									
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Warfare Systems Certification: FY20 Warfare Systems Cert (146 Certification Events + 0 WSCPs)																					
Warfare Systems Certification: FY21 Warfare Systems Cert (146 Certification Events + 0 WSCPs)																					
Warfare Systems Certification: FY22 Warfare Systems Cert (146 Certification Events + 0 WSCPs)																					
Warfare Systems Certification: FY23 Warfare Systems Cert (146 Certification Events + 0 WSCPs)																					
Warfare Systems Cybersecurity: Assessment development, codification, and refinement (metrics & methodology)																					
Warfare Systems Cybersecurity: Align Cyber testing leveraging DIIAC & SFI lab infrastructures and DOD Range where feasible																					
Warfare Systems Cybersecurity: Follow-on Testing Event (AEGIS BMD CS)																					
Warfare Systems Cybersecurity: Assessment refinement and maintenance (metrics & methodology)																					
Warfare Systems Cybersecurity: FY17 Testing Events (Risk reduction LCS)																					
Warfare Systems Cybersecurity: FY18 Testing Events (0)																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration	Schedule Details	
Events by Sub Project		Start		End
Quarter	Year	Quarter	Year	
COMBAT SYSTEM INTEGRATION				
NAVCERT: FY17 NAVCERTs (CG 67, CG 71, CVN 68, DDG 69, DDG 89)	1	2017	1	2017
NAVCERT: FY17 NAVCERTs (CG 54, CG 66, DDG 62, DDG 79, DDG 88 ,DDG 97, LPD 19, LPD 21, LPD 23, LPD 24, MCM 8)	2	2017	2	2017
NAVCERT: FY17 NAVCERT (CG 60, CVN 71, CVN 76, DDG 96, DDG 99, LCS 2, LHD 1, LHD 3, MCM 12)	3	2017	3	2017
NAVCERT: FY17 NAVCERT (CG 53, CVN 74, CVN 75, DDG 65, DDG 81, DDG 84, DDG 93, DDG 101, DDG 106, ,LHD 2, MCM 6, MCM 10)	4	2017	4	2017
NAVCERT: FY18 NAVCERT (CG 62, DDG 53, DDG, 59 , DDG 64, DDG 110, DDG 112, LCC 20, LCS 1, LCS 3, LSD 41, LSD 45, LSD 49)	1	2018	1	2018
NAVCERT: FY18 NAVCERT (DDG 75, DDG 76, DDG 85, DDG 87, LCC 19, LHD 4 ,LPD 26, LSD 41, LSD 49)	2	2018	2	2018
NAVCERT: FY18 NAVCERT (CG 56, CVN 69, DDG 55, DDG 81, DDG 82, DDG 94, LPD 17,LPD 18 , LPD 25)	3	2018	3	2018
NAVCERT: FY18 NAVCERT (DDG 52, DDG 71, DDG 85, DDG 91, DDG 100, LHD 8, LPD 19, MCM 4)	4	2018	4	2018
NAVCERT: FY19 NAVCERTs (CG 58, CVN 71, DDG 78, DDG 100, LHA 6, LPD 22)	1	2019	1	2019
NAVCERT: FY19 NAVCERTs (LPD 22, LHA 6, DDG 105, DDG 103)	2	2019	2	2019
NAVCERT: FY19 NAVCERTs (CVN 68, DDG 52, DDG 78, MCM 3, MCM 9, LHD 7, DDG 90)	3	2019	3	2019
NAVCERT: FY19 NAVCERTs (LSD 52, LPD 21, LHD 6, LSD 50, LHD 2, DDG 68, DDG 54, CVN 77 , MCM 8)	4	2019	4	2019
NAVCERT: FY20 NAVCERTs (CG 59, CVN 75, DDG 55, DDG 59, DDG 65. DDG 107, DDG 108)	1	2020	1	2020
NAVCERT: FY20 NAVCERTs (LHD 3, LPD 23, LSD 49, MCM 11, MCM 14)	2	2020	2	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration			
Events by Sub Project		Start	End		
Quarter	Year	Quarter	Year		
NAVCERT: FY20 NAVCERTs (LHD 1, LPD 23)	3	2020	3	2020	
NAVCERT: FY20 NAVCERTs (CVN 69, CVN 78, DDG 107, LHD 3)	4	2020	4	2020	
NAVCERT: FY21 NAVCERTs (CVN 72, DDG 55, LCS 2, LHD 5, LPD 17, LPD 18, MCM 11)	1	2021	1	2021	
NAVCERT: FY21 NAVCERTs (CG 55, CG 57, DDG 104, DDG 109, LCS 4, LHD 4, LHD 8, LPD 19, LPD 25, LPD 26 LSD 44, LSD 51. LSD 52, MCM 4)	2	2021	2	2021	
NAVCERT: FY21 NAVCERTs (DDG 56, DDG 95, DDG 111, LCS 5, LCS 6, PC 2, PC 3, PC 5, PC 11)	3	2021	3	2021	
NAVCERT: FY21 NAVCERTs (CVN 78, DDG 57, DDG 65, DDG 98, LCS 7, LCS 8, LCS 9)	4	2021	4	2021	
NAVCERT: FY22 NAVCERTs (CG 54, CG 60. DDG 88, LPD 23, MCM 12, CVN 7, DDG 79, DDG 81, DDG 112)	1	2022	1	2022	
NAVCERT: FY22 NAVCERTs (CVN 74, DDG 96, DDG 59, DDG 84, DDG, 99, LHD 3, LPD 24)	2	2022	2	2022	
NAVCERT: FY22 NAVCERTs (CVN 74, CVN 75, CVN 76, DDG 93, LHD 1, LHD 2, MCM 4, MCM 6, MCM 10)	3	2022	3	2022	
NAVCERT: FY22 NAVCERT (CG 62, DDG 53, DDG 82, DDG 101, DDG 106, DDG 110, LCC 19, LCS 3, LHD 4, CVN 71, DDG 63, 99, LPD 17 , LPD 21, PC 14)	4	2022	4	2022	
NAVCERT: FY23 NAVCERT (LHD 3, LHD 4, LPD 18)	1	2023	1	2023	
NAVCERT: FY23 NAVCERT (CG 60, CVN 78, DDG 55, DDG 61, LPD 21)	2	2023	2	2023	
NAVCERT: FY23 NAVCERT (LHD 2, LPD 23, LSD 41)	3	2023	3	2023	
NAVCERT: FY23 NAVCERT (CG 66, CG 70, LCS 8, LHA 7, LSD 43)	4	2023	4	2023	
C5IMP: FY17 C5IMP Monthly Baseline (12/Year) (63 BLs planned)	1	2017	4	2017	
C5IMP: FY17 NCMC - 1	1	2017	4	2017	
C5IMP: FY17 NCMC - 2	2	2017	2	2017	
C5IMP: FY17 SG/ARG Analysis Report (2/Year -Presented at NCMC)	4	2017	4	2017	
C5IMP: FY17 PNA Reviews (12/Year) (Supports Approx 71 ship availabilities with total 11 PNAs planned)	2	2017	4	2017	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration			
Events by Sub Project		Start	End	Quarter	Year
C5IMP: FY18 C5IMP Monthly Baseline (12/Year) (63 BLs planned)	1	2018	4	2018	
C5IMP: FY18 NCMC - 1	1	2018	4	2018	
C5IMP: FY18 NCMC - 2	2	2018	2	2018	
C5IMP: FY18 SG/ARG Analysis Report (2/Year -Presented at NCMC)	4	2018	4	2018	
C5IMP: FY18 PNA Reviews (12/Year) (Supports Approx 72 ship availabilities with total 57 PNAs planned)	2	2018	4	2018	
C5IMP: FY19 C5IMP Monthly Baseline (12/Year)	1	2019	4	2019	
C5IMP: FY19 NCMC - 1	1	2019	4	2019	
C5IMP: FY19 NCMC - 2	2	2019	2	2019	
C5IMP: FY19 SG/ARG Analysis Report (2/Year - Presented at NCMC)	4	2019	4	2019	
C5IMP: FY19 PNA Reviews (12/Year) (Supports Approx 74 ship availabilities with total 49 PNAs planned)	2	2019	4	2019	
C5IMP: FY20 C5IMP Monthly Baseline (12/Year)	1	2020	4	2020	
C5IMP: FY20 NCMC - 1	1	2020	4	2020	
C5IMP: FY20 NCMC - 2	1	2020	4	2020	
C5IMP: FY20 SG/ARG Analysis Report (2/Year - Presented at NCMC)	1	2020	4	2020	
C5IMP: FY20 PNA Reviews (12/Year) (70 Ships)	1	2020	4	2020	
C5IMP: FY21 C5IMP Monthly Baseline (12/Year)	1	2021	4	2021	
C5IMP: FY21 NCMC - 1	1	2021	4	2021	
C5IMP: FY21 NCMC - 2	1	2021	4	2021	
C5IMP: FY21 SG/ARG Analysis Report (2/Year - Presented at NCMC)	1	2021	4	2021	
C5IMP: FY21 PNA Reviews (12/Year) (69 Ships)	1	2022	4	2022	
C5IMP: FY22 C5IMP Monthly Baseline (12/Year)	1	2022	4	2022	
C5IMP: FY22 NCMC - 1	1	2022	4	2022	
C5IMP: FY22 NCMC - 2	1	2022	4	2022	
C5IMP: FY22 SG/ARG Analysis Report (2/Year - Presented at NCMC)	1	2022	4	2022	
C5IMP: FY22 PNA Reviews (12/Year) (69 ships)	1	2022	4	2022	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration			
Events by Sub Project		Start	End		
Quarter	Year	Quarter	Year		
C5IMP: FY23 C5IMP Monthly Baseline (12/Year)	1	2023	4	2023	
C5IMP: FY23 NCMC - 1	1	2023	4	2023	
C5IMP: FY23 NCMC - 2	1	2023	4	2023	
C5IMP: FY23 SG/ARG Analysis Report (2/Year - Presented at NCMC)	1	2023	4	2023	
C5IMP: FY23 PNA Reviews (12/Year) (69 Ships)	1	2023	4	2023	
Interoperability Certification & Assessments: FY17 BL 9C2 Interoperability Certification/Development Tests (17-1): SSDS 10.10.02, AEGIS B/L 9A2 (Build 22); SSDS 9.08.05, LCS Freedom 3.1	1	2017	1	2017	
Interoperability Certification & Assessments: FY17 Interoperability Certification/Development Tests (17-2): AEGIS B/L 9C2.0 (Build 24), SSDS 10.10.04 (LHD 2,CVN72), LCS Independence 6.1, SSDS 10.1	2	2017	2	2017	
Interoperability Certification & Assessments: FY17 Interoperability Certification/Development Tests (17-3): SSDS 10.10.05, LCS 3.1, AEGIS B/L 9A2.0/9C2.0 (Build 24)	3	2017	3	2017	
Interoperability Certification & Assessments: FY18 Interoperability Certification/Developmental Tests (18-1): SSDS 10.10.05, AEGIS B/L 9C2.0 (Build 24)	1	2018	1	2018	
Interoperability Certification & Assessments: Interoperability Certification & Assessments: FY18 Interoperability Certification/Developmental Tests (18-2): AEGIS B/L 9A2.1/9C2.1 (Build 27); AE	2	2018	2	2018	
Interoperability Certification & Assessments: FY18 Interoperability Certification/Developmental Tests (18-3): AEGIS B/L 9A2.1/9C2.1 (Build 27), AEGIS 5.4; LCS Independence 6.X	3	2018	3	2018	
Interoperability Certification & Assessments: FY19 Interoperability Development/Certification Test (19-1): DDG1000 (Build 8.4)	1	2019	1	2019	
Interoperability Certification & Assessments: FY19 Interoperability Development/Certification Test (19-2): AEGIS B/L 9A2.1/9C2.1 (Build 27); AEGIS 5.4	2	2019	2	2019	
Interoperability Certification & Assessments: FY19 Interoperability Development/Certification Test (19-3): AEGIS B/L 9C2.2 (Build 30); DDG1000 (Build 8.4)	3	2019	3	2019	
Interoperability Certification & Assessments: FY19 TBD Interoperability Development/Certification Test (19-4): AEGIS B/L 9A2.2 (Build 30)	4	2019	4	2019	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration			
Events by Sub Project	Start		End		
	Quarter	Year	Quarter	Year	
Interoperability Certification & Assessments: FY20 Interoperability Development/Certification Test (20-1): AEGIS B/L 9A2.2/9C2.2 (Build 30); SSDS 11.X	1	2020	1	2020	
Interoperability Certification & Assessments: FY20 Interoperability Development/Certification Test (20-2): SSDS B/L 11.X (ACB 20)	2	2020	2	2020	
Interoperability Certification & Assessments: FY20 Interoperability Development/Certification Test (20-3): AEGIS B/L 9A2.2/9C2.2 (Build 30); SSDS B/L 11.X	3	2020	3	2020	
Interoperability Certification & Assessments: FY20 Interoperability Development/Certification Test (20-4): SSDS B/L 11.X (ACB 20)	4	2020	4	2020	
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-1)	1	2021	1	2021	
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-2)	2	2021	2	2021	
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-3)	3	2021	3	2021	
Interoperability Certification & Assessments: FY 21 Interoperability Certification & Assessments: FY21 Event (21-4)	4	2021	4	2021	
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-1)	1	2022	1	2022	
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-2)	2	2022	2	2022	
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-3)	3	2022	3	2022	
Interoperability Certification & Assessments: FY 22 Interoperability Certification & Assessments: FY22 Event (22-4)	4	2022	4	2022	
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-1)	1	2023	1	2023	
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-2)	2	2023	2	2023	
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-3)	3	2023	3	2023	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 0164 / Combat System Integration			
Events by Sub Project		Start	End		
Quarter	Year	Quarter	Year		
Interoperability Certification & Assessments: FY 23 Interoperability Certification & Assessments: FY22 Event (23-4)	4	2023	4	2023	
Warfare Systems Certification: FY17 Warfare Systems Cert (145 Certification Events + 50 WSCPs)	1	2017	4	2017	
Warfare Systems Certification: FY18 Warfare Systems Cert (157 Certification Events + 56 WSCPs)	1	2018	4	2018	
Warfare Systems Certification: FY19 Warfare Systems Cert (163 Certification Events + 56 WSCPs)	1	2019	4	2019	
Warfare Systems Certification: FY20 Warfare Systems Cert (146 Certification Events + 0 WSCPs)	1	2020	4	2020	
Warfare Systems Certification: FY21 Warfare Systems Cert (146 Certification Events + 0 WSCPs)	1	2021	4	2021	
Warfare Systems Certification: FY22 Warfare Systems Cert (146 Certification Events + 0 WSCPs)	1	2022	4	2022	
Warfare Systems Certification: FY23 Warfare Systems Cert (146 Certification Events + 0 WSCPs)	1	2023	4	2023	
Warfare Systems Cybersecurity: Assessment development, codification, and refinement (metrics & methodology)	1	2017	4	2018	
Warfare Systems Cybersecurity: Align Cyber testing leveraging DIIAC & SFI lab infrastructures and DOD Range where feasible	1	2017	4	2017	
Warfare Systems Cybersecurity: Follow-on Testing Event (AEGIS BMD CS)	3	2017	4	2017	
Warfare Systems Cybersecurity: Assessment refinement and maintenance (metrics & methodology)	4	2017	4	2017	
Warfare Systems Cybersecurity: FY17 Testing Events (Risk reduction LCS)	1	2017	4	2017	
Warfare Systems Cybersecurity: FY18 Testing Events (0)	1	2018	4	2018	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 3425 / Digital Warfare			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3425: Digital Warfare		0.000	0.000	4.400	0.000	-	0.000	0.000	0.000	0.000	0.000	4.400
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

A. Mission Description and Budget Item Justification

New Project: Digital Warfare

The Chief of Naval Operations concurred with the Task Force Netted Navy recommendation to stand up the Digital Warfare (DW) to set requirements, prioritize resources, and lead efforts on information interoperability and human/machine teaming.

NAVAIR, NAVSEA, SPAWAR, associated Program Executive Offices, warfare and system centers and University Affiliated Research Centers/Federally Funded Research and Development Centers will support the Model Based Engineering, Technical Design, and Requirements branches in the new DW under OPNAV N2N6. In order to develop capability from the top down, the DW will develop requirements for the system of systems to include all of the associated interoperability requirements. Due to the complexity of this work, the DW will evolve the traditional requirements development methodology to a model based systems engineering environment that will include associated model extensions, reports, views, configuration management, help desk support, and documentation. This work will be completed by a series of teams, each focused on a separate threat domain, and made up of system modelers, fleet representatives, program of record representatives, architecture and interoperability experts, etc. The products generated by these teams will include data technical baselines for domain areas with individual profiles for each program of record, coordinated requirements recommendations, and potential areas for S&T and experimentation to fill gaps. The DW will also explore emerging digital technologies including human/machine teaming.

Each SYSCOM will be involved in creating Data Technical Baseline (DTB) profiles specific for each program of record. DTBs may consist of interfaces, protocols, content, information quality, architectural aspects, and knowledge base frameworks. SYSCOMs will exercise technical authority to assess Program of Record compliance to DTBs and Key Performance Parameters in support of gate reviews and system engineering technical reviews.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: SYSCOM/PEO DW Support Articles:	0.000	4.400	0.000	0.000	0.000

Description: The Digital Warfare (DW) will develop requirements, prioritize resources, and lead efforts on information interoperability and human/machine teaming in support of evolution to a digital Navy. NAVAIR, NAVSEA, SPAWAR, associated Program Executive Offices, warfare and system centers and university affiliated research centers (UARCs)/federally funded research and development centers (FFRDCs) will support the Model Based Engineering, Technical Design, and Requirements branches in the new DW under OPNAV N2N6. The work scope includes supporting development of a requirements modeling environment to include associated

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 3425 / Digital Warfare				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
model extensions, reports, views, configuration management, help desk support, and documentation; providing subject matter expert support for mission area model-based engineering teams; development of digital technical baselines for programs as well as associated baselines; exploration of emerging technologies including human/machine teaming; and developing and participating in workforce training in model-based systems engineering.						
FY 2018 Plans: Provide SME support for the domain functional decomposition for prioritized mission areas. Support the analytical agenda from OPNAV N81 and N91 for the specific mission area capabilities. Provide modeling and documentation support for JCIDS, OPNAV POM process, ASN (RD&A) Acquisition Process. Coordinate Program Executive Office (PEO) requirements allocation process. Participate in the definition of MBSE tool functionality and views based on Echelon I stakeholder requirements. Collaboratively develop tool extensions to complement JCIDS and POM processes. Support development of cross-SYSCOM Modeling Standards and Policies for S&T and PoRs. Curate models in the modeling environment. Provide subject matter export support for data science teams in the exploration of data analysis, information and knowledge extraction techniques and application to mission area requirements. Provide engineering inputs to and review NICCs for data architecture consistencies. Explore Machine Learning techniques to support human/machine teaming for decision making. Develop DTBs for PORs under SYSCOM cognizance. Assess DTBs for all SETR events and gate reviews. Provide common infrastructure for MBSE and DTB environments, to include access management, configuration management, and help desk support.						
FY 2019 Base Plans: -Provide Subject Matter Expert (SME) support for the domain functional decomposition based on prioritized mission areas to include Anti-Submarine Warfare, Surface Warfare, Electronic Warfare and Air Warfare. -Continue to establish and implement required extensions to model requirements trace and reports that will be used in the JCIDS process. -Continue to validate current standards across the SYSCOMs to form the overarching Navy DTB in order to facilitate tailoring of each standard for the PoR DTB.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 3425 / Digital Warfare				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
-Continue to validate different SYSCOM architectures and guidance to produce a Navy-wide high level architectural framework. -Continue to develop functional baseline architecture of Navy capabilities that maps back to mission threads. -Tune configuration of, and cyber monitor, the distributed MBSE and data science prototype environment for remote accessibility over a given network enclave, including but not limited to NIPR, SIPR, and JWICS. Investigate cloud computing with respect to the modeling environment. -Continue to integrate cyber requirements across all DW architecture and standard efforts and verify cyber requirements are captured as part of the modeling process. -Continue to provide subject matter expert support for data science teams in the exploration of data analysis, information and knowledge extraction techniques and application to mission area requirements. -Continue to participate in the definition of Model Based Systems Engineering (MBSE) tool functionality and views based on Echelon I stakeholder requirements. Collaboratively develop tool extensions to complement Joint Capabilities Integration and Development System (JCIDS) and Program Objective Memorandum (POM) processes. -Curate models in the modeling environment and support development across Systems Commands (SYSCOMS) in Modeling Standards and Policies for Science and Technology (S&T) and Programs of Record (PoRs). -Develop an overarching Data Technical Baseline (DTB) and DTB profiles for PoRs under SYSCOM cognizance. Assess PoRs against their DTB profile during all Systems Engineering Technical Review events and gate reviews.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding decreased due Proj 3425 Digital Warfare (DW) MBE&DT Development moved to new RDT&EN PE 0603017N.						
Accomplishments/Planned Programs Subtotals		0.000	4.400	0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
N/A						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / <i>Combat System Integration</i>
E. Performance Metrics TBD	Project (Number/Name) 3425 / <i>Digital Warfare</i>

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration				Project (Number/Name) 3425 / Digital Warfare							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DW	WR	NSWCs : Various	0.000	0.000		1.700	Dec 2017	0.000	Dec 2018	-		0.000	0.000	1.700	-
DW	WR	NUWC : Keport	0.000	0.000		1.480	Dec 2017	0.000	Dec 2018	-		0.000	0.000	1.480	-
DW	C/CPFF	Various : Various	0.000	0.000		1.220	Dec 2017	0.000	Dec 2018	-		0.000	0.000	1.220	-
Subtotal			0.000	0.000		4.400		0.000		-		0.000	0.000	4.400	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		4.400		0.000		-		0.000	0.000	4.400	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018	
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
1319 / 4				PE 0603582N / Combat System Integration				3425 / Digital Warfare								
				FY 2017	1	2	3	4	1	2	3	4	1	2	3	4
				FY 2018	1	2	3	4	1	2	3	4	1	2	3	4
				FY 2019	1	2	3	4	1	2	3	4	1	2	3	4
				FY 2020	1	2	3	4	1	2	3	4	1	2	3	4
				FY 2021	1	2	3	4	1	2	3	4	1	2	3	4
				FY 2022	1	2	3	4	1	2	3	4	1	2	3	4
				FY 2023	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3425																
DW: NIPR Cloud/SIPR Compute admin and cyber security																
DW: Navy Data Technical Baseline for TASW, Surface, Air and IW																
DW: Surface Functional Gap Analysis																
DW: Develop Surface Requirements																
DW: Model Air Capabilities/Req																
DW: Air Functional Gap Analysis																
DW: Develop Air Requirements																
DW: Model IW Capabilities/Req																
DW: IW Functional Gap Analysis																
DW: Develop IW Requirements																
DW: Undersea Domain DTB updates																
DW: Migrate to shared SIPR Cloud																
DW: Surface Domain DTB																

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603582N / Combat System Integration	Project (Number/Name) 3425 / Digital Warfare		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Proj 3425				
DW: NIPR Cloud/SIPR Compute admin and cyber security		1	2018	4
DW: Navy Data Technical Baseline for TASW, Surface, Air and IW		1	2018	4
DW: Surface Functional Gap Analysis		1	2018	3
DW: Develop Surface Requirements		2	2018	1
DW: Model Air Capabilities/Req		1	2018	4
DW: Air Functional Gap Analysis		3	2018	1
DW: Develop Air Requirements		4	2018	3
DW: Model IW Capabilities/Req		2	2018	1
DW: IW Functional Gap Analysis		4	2018	2
DW: Develop IW Requirements		2	2019	1
DW: Undersea Domain DTB updates		1	2018	3
DW: Migrate to shared SIPR Cloud		2	2018	3
DW: Surface Domain DTB		2	2018	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603595N / SSBN New Design								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	1,744.587	681.164	776.158	514.846	-	514.846	433.296	313.445	196.082	173.611	Continuing	Continuing	
3220: COLUMBIA Class Submarine Development	1,744.587	681.164	776.158	514.846	-	514.846	433.296	313.445	196.082	173.611	Continuing	Continuing	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): P444													
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$0.046 million to reflect the Department of the Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.													
This program element supports innovative research and development in submarine Hull, Mechanical and Electrical (HM&E) and combat systems technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible. The program element also supports programs transitioning from Science and Technology (S&T), Defense Advanced Research Projects Agency (DARPA), Independent Research and Development, and Small Business Innovation Research (SBIR) projects.													
Project Unit 3220:													
The objective of the SSBN New Design project is to design and prepare for construction of the replacement of the OHIO Class SSBN.													
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
Previous President's Budget		700.811	776.158	514.520		-					514.520		
Current President's Budget		681.164	776.158	514.846		-					514.846		
Total Adjustments		-19.647	0.000	0.326		-					0.326		
• Congressional General Reductions		-	-										
• Congressional Directed Reductions		-	-										
• Congressional Rescissions		-	-										
• Congressional Adds		-	-										
• Congressional Directed Transfers		-	-										
• Reprogrammings		-	-										
• SBIR/STTR Transfer		-19.647	0.000										
• Program Adjustments		0.000	0.000	7.831		-					7.831		
• Rate/Misc Adjustments		0.000	0.000	-7.505		-					-7.505		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603595N / SSBN New Design				3220 / COLUMBIA Class Submarine Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3220: COLUMBIA Class Submarine Development	1,744.587	681.164	776.158	514.846	-	514.846	433.296	313.445	196.082	173.611	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: P444

A. Mission Description and Budget Item Justification

The COLUMBIA Submarine Class Program (previously the OHIO Replacement Class) is developing the next generation sea-based strategic deterrent. The funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for Common Missile Compartment (CMC) design, whole ship design, and component technologies development for the next generation U.S. ballistic missile submarine (SSBN). This RDT&E program supports cooperation with the United Kingdom (UK) to maintain strategic deterrence, based on a single effort to develop a CMC as agreed by the UK Secretary of State for Defense and the U.S. Secretary of Defense in 2009.

The COLUMBIA program strategy is to leverage the re-use of existing Submarine systems (as applicable), focus on Life Cycle Total Ownership Cost (TOC) affordability, and meet the military requirements established for this SSBN to achieve mission success in a challenging environment. The requested funding levels provide for the Technology Development, Design, Engineering, and Integration efforts necessary to support the COLUMBIA Class SSBN lead ship construction start in FY 2021.

The following key activities support a ship acquisition program to replace the OHIO Class SSBNs:

1. Design and development of a missile compartment, launch system, and Strategic Weapons Support Systems (SWSS) to meet U.S. strategic requirements while cooperating with the UK on modernizing its strategic deterrent in accordance with Presidential direction (December 2006).
2. Concept Definition, System Definition, and Detailed Design for remaining portions of the ship will be accomplished through a Design/Build/Sustain approach modeled after the approach used by the VIRGINIA Class program.
3. Engineering and integration of existing technologies and development of new technologies required to provide the capabilities necessary to ensure platform operational effectiveness and minimize life cycle cost.

COLUMBIA Class SSBN Concept Study, System Definition Prototyping, and Technology Development Efforts support design, systems engineering, component development and vendor qualification activities needed to develop the CMC design and the COLUMBIA whole ship design. The COLUMBIA design timelines are based on a design approach proven on the VIRGINIA Class Program, adjusted for the additional complexity of a missile compartment and Strategic Weapons Systems (SWS). Planned technical studies and prototyping are necessary to reduce risks associated with updating SSBN system designs for current technical standards and demonstrating design feasibility of developmental technology to meet the ship design and construction schedule.

The Navy continues to invest in program funded affordability initiatives similar to those employed successfully for VIRGINIA Class, but tailored to the unique SSBN mission and operational tempo of COLUMBIA Class to drive down overall program costs. Efforts focus on reducing ship construction costs through implementing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018					
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design		Project (Number/Name) 3220 / COLUMBIA Class Submarine Development					
more effective design features and fabrication and assembly methods for a more affordable submarine. As part of this effort, alternative procurement and contracting strategies are also being examined to include Multi-Program Material Procurement (MPMP) and Economic Order Quantity (EOQ).								
FY17 activities were executed to ensure the first article quad pack (FAQP) prototype of the CMC remains on schedule to support the UK DREADNOUGHT Program and to continue validation of the Integrated Tube and Hull (ITH) build strategy. These activities included the start of construction for the FAQP in August 2016 with a planned completion in 2019. The CMC program will mature required technologies and re-host the TRIDENT II D5 SWS (Launcher, Fire Control and Navigation) while ensuring no degradation to D5 security, safety, and performance. In addition, whole ship design efforts are focused on technologies requiring significant engineering, integration, and development time as well as those technologies that are required to support ship design and construction schedules such as the propulsor and maneuvering/ship control. These technologies are critical for stealth capability for a ship class that will be in service until the 2080s. Ship detailed design efforts include important pre-construction activities such as finalizing ship arrangements, development of design disclosures to support build products,, risk characterization, and mitigation, improvement and validation of performance prediction tools and improvement of design tools. Technology development will address engineering and integration of existing technologies as well as maturation of developmental technologies.								
On 14 December 2016, the Secretary of the Navy announced the lead ship of the OHIO Replacement Program will be USS COLUMBIA (SSBN 826) which officially designates this program the COLUMBIA Class Submarine Program.								
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Title: Common Missile Compartment Design and Prototyping Articles:	231.057	256.968	183.413	0.000	183.413			
FY 2018 Plans: The combination of CMC Design and Prototyping and Ship Study and Design represents the required LDY Shipbuilder effort for the COLUMBIA Program. CMC Design and Prototyping: This funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for CMC design and component / technology development for the COLUMBIA submarine. Included in this effort is continued development of CMC design and logistics products. Specific planned efforts in FY 2018 include the completion of all remaining CMC arrangements (1045 products) approximately 20% of logistics products, approximately 85 percent of CMC Design Disclosures (850 design disclosures) in support of the MTM build. Specific planned efforts for 2018 also include: continued fabrication, delivery, and outfitting of MTs; continued manufacturing of the FAQP and continued support of development of SWSS for the land based test facility, SWS Ashore (SWSA). Ship Study and Design: This funding applies to the shipbuilder design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for whole ship design, component / technology development for the COLUMBIA submarine. Specific efforts in FY 2018 include the completion of 90 percent of	-	-	-	-				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	total Arrangements (approximately 3800 arrangement disclosures including CMC arrangements), 35 percent of total Design Disclosures (approximately 1597 design disclosures including CMC design disclosures), and 7 percent of logistics technical documentation, and supportability assessments. Efforts will also continue towards maintaining configuration control for all CMC interfaces with RoS and progressing ship integration of the Propulsor design.					
FY 2019 Base Plans: The combination of CMC Design and Prototyping with Whole Ship Study and Design represents the required LDY Shipbuilder effort for the COLUMBIA Program. CMC Design and Prototyping: This funding applies to the design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for CMC design and component / technology development for the COLUMBIA submarine. Included in this effort is continued development of CMC design products. Specific planned efforts in FY 2019 include the completion of approximately 40 percent of logistic products and 97 percent of CMC Design Disclosures (964 design disclosures) in support of the MTM build. Specific planned efforts for 2019 also include: continued fabrication of MTs; completion of manufacturing of the FAQP and manufacturing in support of the Missile Tube Module, and continued development of SWSS for the land based test facility, SWSA. Whole Ship Study and Design: This funding applies to the shipbuilder design, systems engineering, prototyping, and vendor qualification activities needed to execute the schedule for whole ship design and component / technology development for the COLUMBIA submarine. Specific efforts in FY 2019 include the completion of 97 percent of total Arrangements (approximately 4104 arrangement disclosures including CMC arrangement), 60 percent of total Design Disclosures (approximately 2735 design disclosures including CMC design disclosures) , 12 percent of logistics technical documentation, and supportability assessments. Efforts will also continue towards maintaining configuration control for all CMC interfaces with Rest of Ship and progressing ship integration of the Propulsor design.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Overall efforts transitioning to SCN Detailed Design and construction efforts						
Title: NAVSEA R&D and Prototyping		189.618	276.681	155.860	0.000	155.860

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Articles:		-	-	-	-	-
FY 2018 Plans: This funding applies to the Government combat systems, component and technology development for the COLUMBIA submarine essential to achieving required signatures, maneuverability, combat and communications capabilities. Efforts in FY 2018 will include: completing hardware manufacturing for VLTA and Large Scale Vehicle (LSV) testing, and testing of Generation 2 propulsor designs on the VLTA in water tunnels and on the LSV at the Acoustic Research Detachment. The COLUMBIA Program will complete installation and begin testing and calibration of an array upgrade to support Generation 2 propulsor large scale vehicle testing, and will continue testing on the full scale bearing test facility (FSBTF). Preliminary hydrodynamic characterization and submerged operating envelope development will begin as well as completion of bow dome attachment qualification tests and continued development of detailed designs for the COLUMBIA sonar bow dome. In addition, continued efforts for: development, refinement, and delivery of GFI for NPES, stowage arrangements to support these systems, support arrangement and design disclosure progress, continued development and assessment of AN/BRR-6 reliability based updates, and continued systems architecture assessment and development in conjunction with existing submarine classes to achieve and deliver common combat system architecture across existing submarine classes. Finally this effort will continue Government support and oversight of development of approximately 98 engineered components, begin diesel generator qualification testing, complete fabrication of qualification ACRU and begin qualification testing. CMC will continue preparations for construction of the missile tube module leveraging lessons from FAQP prototype.						
FY 2019 Base Plans: This funding applies to the Government combat systems, component and technology development for the COLUMBIA submarine essential to achieving required signatures, maneuverability, combat and communications capabilities. Efforts planned in FY 2019 include: Combat Systems: Continue refinement and updates to GFI to support detailed design, production, and manufacturing integration, continued assessment of AN/BRR-6 reliability based updates, including land based system development and test, and early environmental qualification testing of Government Furnished Equipment supporting Columbia technical insertion. Component Development: Continue Government support and oversight of development of over 98 engineered components, deliver prototype diesel generator to compatibility test facility for integration testing, complete ACRU qualification testing and restoration, submit ACRU OPALT package for approval, award contract for lead						

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
ship ACRU procurement, and continue operation of prototype ACRU at NSWC Philadelphia to gather reliability and performance data.						
Propulsor and Shafting: Complete full scale mechanical propulsor designs, complete generation 2 propulsor LSV testing, complete final rotor hydrodynamic design, down-select design for fixed portion of propulsor, test candidate COLUMBIA Class propulsor bearing liner materials at the FSBTF, and begin reconfiguring the FSBTF for COLUMBIA propulsor bearing testing.						
Shock, Structures and Composites: Continue fabrication of combined shock and submergence scale models, complete fabrication of the forward pressure hull confirmation model, continue forward pressure hull need to repair procedures, continue out-of-autoclave bow dome fabrication, and begin navigation sonar system window fabrication.						
Signatures: evaluate data from PIKE model testing with stern section.						
Maneuvering, Ship Control and Hydrodynamic: Deliver steering and diving, assisted ballast and trim, and anomaly detector algorithms to shipbuilder for incorporation into ship control software.						
Modular Construction Prototyping: continue construction of the prototype FAQP and validation of the ITH manufacturing technique as well as applying modular construction techniques to be further applied to the entire MTM. Additionally, this effort includes manufacture of the remaining lead ship COLUMBIA missile tubes that will be incorporated into the prototype MTM.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Overall efforts transitioning to SCN Detailed Design and construction efforts						
Title: Systems Engineering/Program Management	Articles:	55.750	57.279	56.383	0.000	56.383
FY 2018 Plans: This funding applies to the Government oversight, including Program Office management and technical support from government laboratories, for review, analysis and approval of lead design yard and various government performers' design deliverables. Specific efforts in FY 2018 will include logistics life cycle development,		-	-	-	-	-

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	integration of supportability assessment information, identification and assessment of platform, shore facilities and infrastructure requirements; development of maintenance and repair standards; and higher fidelity functional mapping of CDD requirements to key subordinate design documents such as the NPES Functional Requirements Document (FRD) and Ship Building Specifications in support of both the planned System Engineering Technical Review (SETR) events and platform arrangements reviews and staffing of other design deliverables from the LDY and Participating Acquisition Resource Managers (PARM). Tabletop platform cyber risk assessments, including deep dives into mission essential systems, will continue. Conclude OT-B1 and provide a test report to Director Operational Test and Evaluation regarding risk to successful resolution of the critical operational issues identified in the TEMP. Planned LFT&E activities include procurement of Sonar components in synchronization with the PARM's procurement action to support of planned Commercial Off The Shelf (COTS) equipment fragility testing in FY20 and calibration testing of the test bed; and conduct High Capacity Mount/Damper testing to characterize the shock environment of COLUMBIA Class shock-isolated decks. Complete the first COLUMBIA Class Survivability Assessment Report (SAR) Cyber Developmental and Operational Test (DT/OT) events will be planned and conducted. The maturation of the OT-B1 COLUMBIA Survivability M&S baseline will continue, taking leverage from relevant at sea data collected by other programs and the Fleet so as to reduce the need for COLUMBIA first of class sea testing. Complete IWG efforts with final development and acceptance of integration risks and associated mitigations.					
FY 2019 Base Plans: <p>The Program will conduct a Construction Request for Proposal (RFP) Defense Acquisition Board in the first half of the year and a Critical Design Review (CDR) in the second half of FY 2019. The TEMP will be updated as will the LFT&E Management Plan. The final increment of NPES COTS (Imaging and Combat System components) will be procured in support of FY 2020 COTS fragility testing at Naval Surface Warfare Center Philadelphia. Survivability M&S maturation will continue at NUWC with the objective of assuring that the suite will support accreditation by COMOPTEVFOR before Initial Operational Test and Evaluation in FY2028. The COLUMBIA Class Program Office will continue to report on results of developmental testing conducted to DASD(DT&E) in accordance with the TEMP. Additional significant 2019 milestones will include: Cyber Risk assessments to support continual cyber security development, early Strategic Program System Integration into NPES Systems, and Development of Columbia Electronics Integration Plan to support shore side Command and Control integration and test, and execution of integration risk mitigations as identified by the IWG.</p> FY 2019 OCO Plans:						

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Minimal decrease from FY18 to FY19 due to rate changes.								
Title: Strategic Weapons Systems Integration	Articles:		204.739	185.230	119.190	0.000	119.190	
FY 2018 Plans: Continuing system engineering efforts required for the re-hosting and integration of the TRIDENT II (D5) SWS on the COLUMBIA submarine including review and modification of SWS Coordination, Interface and Arrangement Drawings for SWS equipment within the CMC and performing associated Logistic Support activities. The COLUMBIA program will also complete launcher evaluation testing at the LTF. The COLUMBIA program will continue: SWS Test Systems material procurement and builds and complete remaining land-based test berth / facility modifications. Continue development of special test vehicles; SWS Ashore test capability development; SWS training capability/requirements development. Continue systems engineering design related to the COLUMBIA guidance handling cart and procurement of a prototype guidance handling cart. The COLUMBIA CLASS program will also continue detailed design efforts required to conduct SWS Launcher, Fire Control, Navigation and Reentry System-level Critical Design Reviews. Commence Reentry Body Simulator material procurement and build.			-	-	-	-	-	
FY 2019 Base Plans: Continuing system engineering efforts required for the re-hosting and integration of the TRIDENT II (D5) SWS on the COLUMBIA submarine including review and modification of SWS Coordination, Interface and Arrangement Drawings for SWS equipment within the CMC and performing associated Logistic Support activities. The COLUMBIA program will also commence qualification launches at the LTF. The COLUMBIA program will continue SWS Test Systems material procurement and builds, development of special test vehicles, and SWS Ashore test capability development. Continue SWS training capability/requirements development and conduct a SWS Training System Critical Design Review involving both the SWS Fire Control and Navigation subsystems. Continue systems engineering design related to the COLUMBIA guidance handling cart and commence a Safety Assessment Review. The COLUMBIA program will commence utilization of the SWS Fire Control Engineering Test System within the land-based test berth and deliver a Guidance Handling Cart prototype. The COLUMBIA program also will conduct Production Readiness Reviews for SWS Fire Control and Navigation subsystems.								

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Appropriation/Budget Activity			R-1 Program Element (Number/Name)				Project (Number/Name)												
1319 / 4			PE 0603595N / SSBN New Design				3220 / COLUMBIA Class Submarine Development												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Continue Reentry Body Simulator production. Additional plans include continuing efforts of the Integration Working Group to execute early integration of NPES with strategic weapon systems.																			
FY 2019 OCO Plans: N/A																			
FY 2018 to FY 2019 Increase/Decrease Statement: Overall efforts transitioning to Detailed Design and construction efforts																			
Accomplishments/Planned Programs Subtotals											681.164	776.158	514.846	0.000	514.846				
C. Other Program Funding Summary (\$ in Millions)																			
Line Item		FY 2017	FY 2018	FY 2019 <u>Base</u>	FY 2019 <u>OCO</u>	FY 2019 <u>Total</u>	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost							
• RDTEN/0603570N/3219: SBSD Nuclear Technology Development		390.326	265.462	190.100	-	190.100	114.006	80.085	60.142	56.841	Continuing	Continuing							
• RDTEN/0101221N/0951: Joint Warhead Fuze Sustainment Program		111.857	109.730	62.203	-	62.203	28.820	21.777	0.000	0.000	0.000	0.000	726.644						
• OPN/5358: Strategic Missile Systems Equip		215.138	246.221	271.817	-	271.817	274.440	241.396	254.053	259.020	Continuing	Continuing							
• WPN/1250: TRIDENT II Mods		1,099.086	1,143.595	1,078.750	-	1,078.750	1,178.210	1,217.078	1,205.587	1,308.930	3,215.106	24,862.561							
• OMN/1D2D: Fleet Ballistic Missile		1,241.095	1,278.456	1,361.947	-	1,361.947	1,379.668	1,397.882	1,432.037	1,460.413	Continuing	Continuing							
• SCN/1045: COLUMBIA Class Submarine		773.138	842.853	3,005.330	-	3,005.330	1,453.159	4,214.573	4,198.025	3,875.888	90,686.558	109,049.524							
• MCN/32414106: Submarine Propulsor Manufacturing Support Facility		0.000	0.000	71.050	-	71.050	0.000	0.000	0.000	0.000	0.000	0.000	71.050						
Remarks																			
D. Acquisition Strategy																			
The Common Missile Compartment (CMC) will be designed and developed to support the U.S. and UK in development of the COLUMBIA and DREADNOUGHT SSBN programs enabling a common U.S.-UK CMC and maximizing the benefit of the ongoing U.S.-UK partnership in strategic deterrence. The COLUMBIA Class Program																			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development
R&D efforts will incentivize cost reduction initiatives in the design, construction and operations & support portions of the program. R&D efforts will be performed by Navy laboratories, shipyards, private industry, and University Affiliated Research Centers.		
E. Performance Metrics Updated Integrated Master Schedule and CMC build strategy down-select. Development of signature management efforts to address knowledge gap, concepts for propulsor and shafting, and design guidance and interface control requirements.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design				Project (Number/Name) 3220 / COLUMBIA Class Submarine Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	SS/CPFF	Ship Design Contractor-EB : Groton, CT	942.360	231.057	Oct 2016	256.968	Oct 2017	183.413	Oct 2018	-		183.413	Continuing	Continuing	Continuing
Product Development	WR	NSWC : Carderock, MD	298.547	89.804	Oct 2016	105.462	Oct 2017	58.307	Oct 2018	-		58.307	Continuing	Continuing	Continuing
Product Development	WR	NSWC : Philadelphia, PA	0.000	27.142	Oct 2016	31.791	Oct 2017	17.695	Oct 2018	-		17.695	0.000	76.628	-
Product Development	WR	NUWC : Newport, RI	35.853	19.970	Oct 2016	23.270	Oct 2017	12.951	Oct 2018	-		12.951	Continuing	Continuing	Continuing
Product Development	Various	NAVSEA : Various	47.218	52.702	Oct 2016	116.159	Oct 2017	66.907	Oct 2018	-		66.907	Continuing	Continuing	Continuing
Product Development	SS/CPFF	ARL Penn State University : State College, PA	0.984	0.377	Oct 2016	0.900	Oct 2017	0.931	Oct 2018	-		0.931	Continuing	Continuing	Continuing
Product Development	SS/CPFF	NGMS : Sunnyvale, CA	87.324	46.912	Oct 2016	35.183	Oct 2017	17.040	Oct 2018	-		17.040	Continuing	Continuing	Continuing
Product Development	SS/CPFF	JHU/APL : Laurel, MD	8.396	6.102	Oct 2016	5.542	Jan 2018	6.230	Jan 2019	-		6.230	Continuing	Continuing	Continuing
Product Development	WR	NUWC : Keyport, WA	0.000	0.652	Oct 2016	0.480	Oct 2017	0.372	Oct 2018	-		0.372	Continuing	Continuing	Continuing
Product Development	SS/CPFF	CSDL : Cambridge, MA	6.596	2.485	Oct 2016	0.794	Oct 2017	0.370	Oct 2018	-		0.370	Continuing	Continuing	Continuing
Product Development	SS/CPFF	LMRMS : Mitchel Field, NY	27.654	22.153	Oct 2016	21.899	Dec 2017	14.446	Oct 2018	-		14.446	Continuing	Continuing	Continuing
Product Development	C/CPFF	EMCUBE : Alexandria, VA	1.666	0.693	Oct 2016	1.157	Oct 2017	1.158	Oct 2018	-		1.158	Continuing	Continuing	Continuing
Product Development	SS/CPFF	LMMSC : Sunnyvale, CA	52.288	22.962	Apr 2017	20.986	Oct 2017	13.462	Feb 2019	-		13.462	Continuing	Continuing	Continuing
Product Development	SS/CPFF	JRC : Washington, DC	1.663	1.333	Oct 2016	3.337	Oct 2017	3.387	Oct 2018	-		3.387	Continuing	Continuing	Continuing
Product Development	C/CPFF	GDMS : Pittsfield, MA	54.852	39.481	Oct 2016	34.057	Nov 2017	12.600	Nov 2018	-		12.600	Continuing	Continuing	Continuing
Product Development	WR	CNSW : China Lake, CA	24.595	25.134	Oct 2016	19.008	Nov 2017	15.972	Nov 2018	-		15.972	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design					Project (Number/Name) 3220 / COLUMBIA Class Submarine Development						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	SS/CPFF	IEC : Anaheim, CA	2.159	0.710	Oct 2016	0.539	Oct 2017	0.505	Oct 2018	-		0.505	Continuing	Continuing	Continuing
Product Development	WR	NSWC : Dahlgren, VA	7.154	5.981	Oct 2016	8.059	Oct 2017	7.244	Oct 2018	-		7.244	Continuing	Continuing	Continuing
Product Development	SS/CPFF	BAE : Rockville, MD	17.724	10.091	Oct 2016	8.397	Oct 2017	6.674	Oct 2018	-		6.674	Continuing	Continuing	Continuing
Product Development	SS/CPFF	BNA : Huntington Beach, CA	1.768	1.449	Oct 2016	0.000	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Product Development	WR	NSWC Crane : Crane, IN	30.357	13.715	Oct 2016	8.960	Nov 2017	8.204	Nov 2018	-		8.204	Continuing	Continuing	Continuing
Product Development	SS/CPFF	GDEB : Groton, CT	0.000	0.000		5.830	Oct 2017	4.804	Oct 2018	-		4.804	0.000	10.634	-
Product Development	Various	SSP : Various	9.536	2.032	Oct 2016	8.096	Oct 2017	4.085	Oct 2018	-		4.085	Continuing	Continuing	Continuing
Product Development	SS/CPFF	SPA : Alexandria, VA	5.655	2.477	Oct 2016	2.006	Oct 2017	1.706	Oct 2018	-		1.706	Continuing	Continuing	Continuing
Subtotal				1,664.349	625.414		718.880		458.463			458.463	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Management Support	C/CPFF	Various : Multiple Awards	41.863	30.304	Oct 2016	30.758	Nov 2017	29.463	Nov 2018	-		29.463	Continuing	Continuing	Continuing
Government Management Support	WR	Various: NSWC : Carderock, MD	37.509	14.815	Oct 2016	15.725	Oct 2017	15.959	Oct 2018	-		15.959	Continuing	Continuing	Continuing
Government Management Support	WR	Various: NSWC : Philadelphia, PA	0.000	3.240	Oct 2016	3.289	Oct 2017	3.338	Oct 2018	-		3.338	0.000	9.867	-
Government Management Support	WR	Various: NUWC : Newport, RI	0.000	5.034	Oct 2016	5.109	Oct 2017	5.186	Oct 2018	-		5.186	0.000	15.329	-
Government Management Support	WR	Vairous: SUPSHIP : Groton, CT	0.000	1.744	Oct 2016	1.770	Oct 2017	1.797	Oct 2018	-		1.797	0.000	5.311	-
Travel	WR	NAVSEA HQ : Washington, D.C.	0.866	0.613	Nov 2016	0.627	Nov 2017	0.640	Nov 2018	-		0.640	Continuing	Continuing	Continuing
Subtotal				80.238	55.750		57.278		56.383			56.383	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design				
												Project (Number/Name) 3220 / COLUMBIA Class Submarine Development				
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Remarks The program analyzed the Management Services which were originally planned in SCN beginning in FY17, and determined it was more appropriately funded with R&D through lead ship construction start in FY21. This submission reflects those changes for FY17, FY18 and FY19.																
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				1,744.587	681.164		776.158		514.846		-		514.846	Continuing	Continuing	N/A
Remarks The listed Award Dates represent the date on which initial obligations occur for the effort.																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

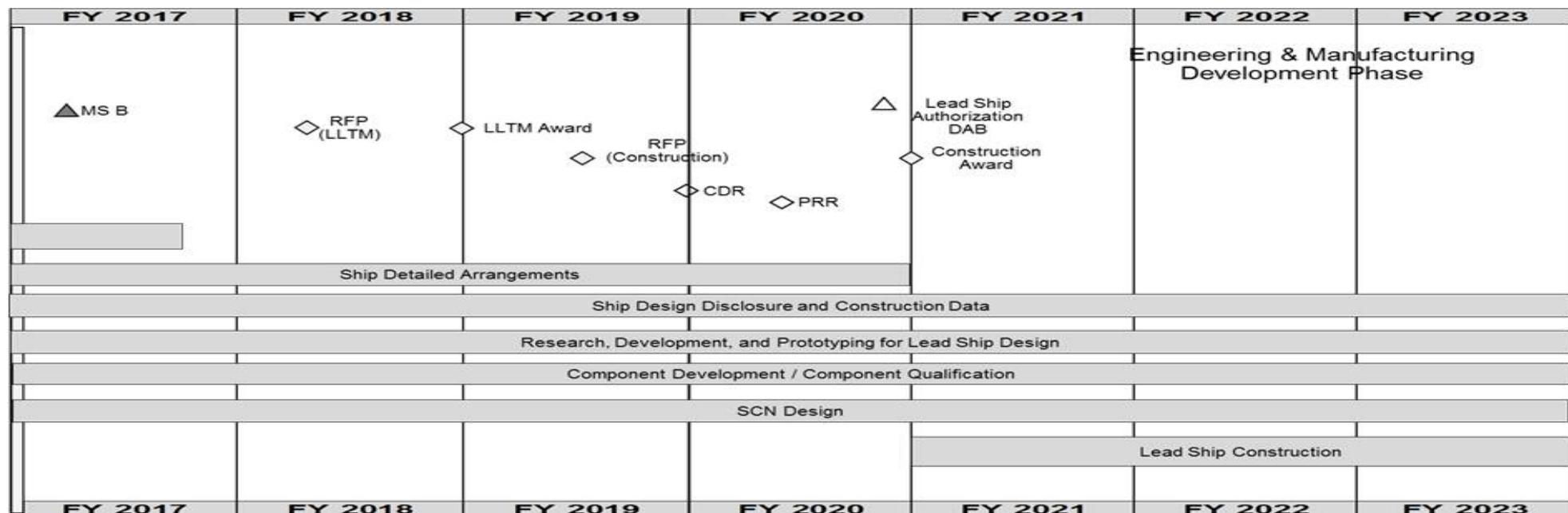
1319 / 4

R-1 Program Element (Number/Name)

PE 0603595N / SSBN New Design

Project (Number/Name)

3220 / COLUMBIA Class Submarine Development



CDD - Capabilities Development Document
CDR - Critical Design Review
CPD - Capability Production Document
DAB - Defense Acquisition Board
IPR - In Progress Review

JROC - Joint Requirements Oversight Council
LLTM - Long Lead Time Material
MS - Milestone
PDR - Preliminary Design Review
PRR - Production Readiness Review

RDT&E - Research, Development, Test, & Evaluation
RFP - Request for Proposal
SCN - Shipbuilding and Conversion, Navy
SRR - System Requirements Review

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603595N / SSBN New Design	Project (Number/Name) 3220 / COLUMBIA Class Submarine Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Notes: * Effort began prior to 1st Quarter FY 2017. ** Effort continues past 4th Quarter FY 2023				
System Descriptions and Rev A Diagrams*	1	2017	3	2017
Ship Detailed Arrangements*	1	2017	4	2019
Ship Design Disclosure and Construction Data*, **	1	2017	3	2023
Research, Development, and Prototyping for Lead Ship*, **	1	2017	4	2023
Component Development/Component Qualification* , **	1	2017	4	2023
SCN Design**	1	2017	4	2023
Lead Ship Construction**	1	2021	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603596N / (U)LCS Mission Modules								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	371.619	153.595	116.871	103.633	-	103.633	70.548	45.057	46.016	28.703	Continuing	Continuing	
2550: Mine Countermeasure (MCM) Mission Package	0.000	0.000	0.000	41.813	-	41.813	39.499	26.419	27.878	10.793	Continuing	Continuing	
2551: Anti-Submarine Warfare (ASW) Mission Package	0.000	0.000	0.000	41.553	-	41.553	19.180	9.282	8.884	8.500	Continuing	Continuing	
2552: Surface Warfare (SUW) Mission Package	0.000	0.000	0.000	11.368	-	11.368	1.558	0.000	0.000	0.000	0.000	12.926	
3129: LCS Mission Package Development	371.619	153.595	116.871	8.899	-	8.899	10.311	9.356	9.254	9.410	Continuing	Continuing	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): 443													
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$0.224 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.													
This Program Element (PE) provides funds for detailed design, development, issue resolution, certification, integration, and testing of the Littoral Combat Ship (LCS) Mission Modules (MM). LCS is a fast, agile, and networked surface combatant with capabilities optimized to defeat asymmetric threats, and ensure naval and joint force access into contested littoral regions. It uses open-systems architecture design, modular weapons, sensor systems, and a variety of manned and unmanned vehicles to expand the battle space and project offensive power into the littoral.													
The LCS MM Program is utilizing an incremental development approach to deliver capability, which allows the continued insertion of mature capabilities throughout the life of the program without the need for modifications to the sea frames. Future capabilities will be considered when joint warfighting objectives or changing threats create new operational capability requirements that cannot be met by current mission package designs, or when new technological opportunities allow significant progress toward delivering cost effective, enhanced capabilities. Future mission module increments can be tested, constructed, and incorporated into existing mission packages, one of the most important benefits of LCS modular design.													
Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:													
2550 Mine Countermeasures (MCM) Mission Package													
2551 Anti-Submarine Warfare (ASW) Mission Package													
2552 Surface Warfare (SUW) Mission Package													
3129 LCS Mission Package Development													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018				
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				
Prior to FY 2019 all Mission Package funding was in project 3129.					
MCM MP: Counters bottom, tethered, near surface, and surface mines in the littorals without putting sailors in the minefield.					
SUW MP: Increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes and move a force quickly through a choke point or other strategic waterway, and to conduct maritime security missions.					
ASW MP: Enables the LCS to conduct detect-to-engage operations against modern submarines that pose a threat.					
C5I: Once mission package specific RDT&E funding was split out from the LCS Mission Package Development project element 3129, the remaining funds provide the enabling products required by all MPs such as common hardware interfaces, computer operating environment (Mission Package Computing Environment (MPCE)), communications systems (Multi-Vehicle Communications System (MVCS)), aviation interface systems, and Mission Package Portable Control Stations (MPPCS). The MPCE provides common services and an Operating Environment to support all Mission Package Application Software and Open Architecture Products. The MVCS enables the simultaneous control and data exchange between unmanned mission vehicles and the Ship. Aviation interface systems include integration and management of data communications, data processing, and physical hardware interfaces such as common equipment and containers used by all mission packages. The MPPCS provides a mobile operating environment installed in a 20ft ISO container and serves as a surrogate Ship during mission package development and integration test events at test ranges.					
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	160.058	116.871	78.302	-	78.302
Current President's Budget	153.595	116.871	103.633	-	103.633
Total Adjustments	-6.463	0.000	25.331	-	25.331
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	26.976	-	26.976
• Rate/Misc Adjustments	0.000	0.000	-1.645	-	-1.645
• Congressional General Reductions	-0.013	-	-	-	-
• Congressional Directed Reductions	-6.450	-	-	-	-
• Congressional Directed Reductions	-	-			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules
<p>Change Summary Explanation</p> <p>Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:</p> <p>2550 Mine Countermeasures (MCM) Mission Package 2551 Anti-Submarine Warfare (ASW) Mission Package 2552 Surface Warfare (SUW) Mission Package 3129 LCS Mission Package Development</p> <p>Prior to FY 2019 all mission package funding was in project 3129.</p> <p>The increase in FY 2019 addresses MCM shortfalls and supports stand up of the LCS MCM divisions to minimize service life extensions to both MCM-1 ships and the MH-53E Helicopters. Specifically, this increase funds the completion of MCM USV integration into the MCM MP to support formal developmental testing in FY 2019 / FY 2020, operational testing in FY 2020, and MCM MP Initial Operational Capability in FY 2021.</p> <p>Additionally, the increase in FY19 supports ASW mission package integration on Independence variant and initiation of the ASW ACB/TI process.</p>	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603596N / (U)LCS Mission Modules				2550 / Mine Countermeasure (MCM) Mission Package			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2550: Mine Countermeasure (MCM) Mission Package	0.000	0.000	0.000	41.813	-	41.813	39.499	26.419	27.878	10.793	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 443												
A. Mission Description and Budget Item Justification												
Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:												
2550 Mine Countermeasures (MCM) Mission Package												
2551 Anti-Submarine Warfare (ASW) Mission Package												
2552 Surface Warfare (SUW) Mission Package												
3129 LCS Mission Package Development												
Prior to FY 2019 all Mission Package funding was in project 3129.												
The LCS MM Program is utilizing an incremental development approach to deliver capability, which allows the continued insertion of mature capabilities throughout the life of the program without the need for modifications to the sea frames. Future Mine Countermeasures (MCM) MP capabilities will be considered when joint warfighting objectives or changing threats create new operational capability requirements that cannot be met by current mission package designs, or when new technological opportunities allow significant progress toward delivering cost effective, enhanced capabilities. Future mission module increments can be tested, constructed, and incorporated into existing mission packages, one of the most important benefits of LCS modular design.												
The MCM MP will counter deep, shallow, and tethered mines in the littoral without putting Sailors in the minefield. When the MCM MP is embarked, LCS is capable of conducting detect-to-engage operations (hunting, sweeping, and neutralization) against very shallow to deep-water sea mine threats. The MCM MP provides these capabilities through the use of sensors and weapons deployed from an MH-60S multi-mission helicopter, unmanned off-board vehicles, and support equipment/containers. The MCM MP consists of the following modules:												
<ul style="list-style-type: none"> - Remote Minehunting (RMH) Module: MCM Unmanned Surface Vehicle (MCM USV) + AN/AQS-20 Minehunting Sonar - Coastal Mine Reconnaissance (CMR) Module: Coastal Battlefield Reconnaissance & Analysis (COBRA) + MQ-8B Fire Scout Vertical Take-off and Landing Tactical Unmanned Aerial Vehicle (VTUAV) - Near Surface Detection (NSD) Module: Airborne Laser Mine Detection System (ALMDS) + MH-60S Helicopter - Airborne Mine Neutralization (AMN) Module: Airborne Mine Neutralization System (AMNS) + MH-60S Helicopter - Unmanned Minesweeping (UMS) Module: Unmanned Influence Sweeping System (UISS) (MCM USV + Unmanned Surface Sweep System) - Buried Minehunting (BMH) Module: Knifefish Unmanned Underwater Vehicle (UUV) 												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603596N / (U)LCS Mission Modules	2550 / Mine Countermeasure (MCM) Mission Package				
The RMH Module provides sustained mine hunting and clearing from the surface, the UMS Module provides endurance bottom and volume sweep capability, the CMR Module will allow detection of minefield patterns and obstacles from an embarked Fire Scout VTUAV in the beach zone, and the BMH Module will allow detection of buried mines. When complete, the MCM MP will provide full capability against floating, tethered, bottom, and buried mines.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Mine Countermeasures (MCM) Mission Modules	Articles:	0.000	0.000	41.813	0.000	41.813
FY 2018 Plans: Funded under project 3129 LCS Mission Package Development.		-	-	-	-	-
FY 2019 Base Plans: For the Mine Countermeasures (MCM) Mission Package (MP) Remote Minehunting (RMH) Module, commence integration AN/AQS-20C on MCM USV + hunt and conduct initial at-sea tests. Testing requires chase boats, placement and removal of mines in a minefield. Commence integration of MCM USV + hunt on Independence variant. Modify MPAS 3.0.0.0 to incorporate MCM USV and AN/AQS-20C software. For the MCM MP Airborne Mine Neutralization (AMN) Module, integrate and conduct at-sea tests on Freedom variant. Commence studies to Integrate Barracuda on the MCM USV. Certify AMN module for use on Freedom variant. For the MCM MP Near Surface Detection (NSD) Module, integrate and conduct at-sea test on Freedom variant. Testing requires placement and removal of mines in a minefield along with 24 hours monitoring of minefield with an at-sea chase boat. Certify NSD module for use on Freedom variant. For the MCM MP Coastal Mine Reconnaissance (CMR) Module, integrate and conduct at-sea test on Freedom variant. Certify CMR module for use on Freedom variant. For the MCM MP Unmanned Minesweeping (UMS) module, conduct UISS at-sea Developmental Test (DT), conduct UMS integration, at-sea DT, and at-sea Operational Assessment (OA) on LCS Independence variant. Testing requires chase boats, placement and removal of mines in a minefield, and procurement of test spares and test support equipment. Modify MPAS 2.0.0.0 incorporating correction of software Problem Trouble Reports (PTRs) identified during UMS DT.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018								
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			Project (Number/Name)													
1319 / 4		PE 0603596N / (U)LCS Mission Modules			2550 / Mine Countermeasure (MCM) Mission Package													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
<p>For the MCM Buried Minehunting (BMH) Module, conduct pier-side Knifefish Launch and Recovery demonstration, conduct integration and at-sea Knifefish DT and BMH DT on Independence variant. Testing requires placement and removal of mines in a minefield, and procurement of test spares and test support equipment. Modify MPAS 2.0.0.0 incorporating correction of software Problem Trouble Reports (PTRs) identified during BMH DT. Deliver and install common Post Mission Analysis (PMA) hardware on LCS.</p> <p>For the entire MCM MP, conduct DT work-ups and at-sea MCM DT-B10 Phase I testing integrating AMN, NSD, CMR, RMH, UMS and BMH modules. Testing requires chase boats, placement and removal of mines in a minefield, procurement of test spares and test support equipment and at-sea chase craft to monitor the minefield 24/7.</p> <p>In support of MCM MP, develop and delivery MCM Mission Package Application Software (MPAS) build 3.0.0.0. Perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management and Integrated Logistics Support (ILS). Continue to compile system and package level Reliability and Maintainability (RAM-C) data to support reliability engineering and a prioritized initial spares list. Perform Full Operational Capability (FOC) RAM-C analysis with updated data and update RAM-C Rationale Report. Continue MCM MP Failure Reporting, Analysis, and Corrective Action System (FRACAS) effort. Integration and development efforts for vehicle-based MVCS are included within the corresponding module development.</p>																		
<p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Significant increase in at-sea testing of MCM MP on LCS Independence variant resulting from contractor delivery of MCM USV, Knifefish and UISS systems.</p>										Accomplishments/Planned Programs Subtotals	0.000	0.000	41.813	0.000	41.813			
C. Other Program Funding Summary (\$ in Millions)												Cost To Complete		Total Cost				
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost							
• 1600: LCS Common Mission Modules Equipment	14.670	34.666	46.732	-	46.732	51.553	36.657	55.776	29.787	734.284	1,427.898							
• 1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,403.599	2,673.330							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package		
C. Other Program Funding Summary (\$ in Millions)										
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>
Remarks										
D. Acquisition Strategy The LCS MM Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.										
E. Performance Metrics Program Completed Milestone B January 2014 Complete MCM MP DT, TECHEVAL, and IOT&E on Independence variant Achieve MCM MP Initial Operational Capability (IOC) on Independence variant Conduct MCM MP DT, TECHEVAL, and IOT&E on Freedom variant										

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules						Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package				
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MCM MP	WR	NSWC PCD : Panama City, FL	0.000	0.000		0.000		21.242	Nov 2018	-		21.242	Continuing	Continuing	Continuing	
MCM MP	Sub Allot	PMS 406 : Various	0.000	0.000		0.000		5.000	Feb 2019	-		5.000	6.400	11.400	-	
MCM MP	Sub Allot	PMS 495 : Various	0.000	0.000		0.000		1.000	Feb 2019	-		1.000	2.400	3.400	-	
MCM MP	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		4.571	Dec 2018	-		4.571	12.800	17.371	-	
MCM MP	C/CPIF	Northrop Grumman : Bethpage, NY	0.000	0.000		0.000		9.600	Jan 2019	-		9.600	4.800	14.400	-	
Subtotal			0.000	0.000		0.000		41.413		-		41.413	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MCM Program Management	C/CPFF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.000		0.400	Oct 2018	-		0.400	1.680	2.080	-	
Subtotal			0.000	0.000		0.000		0.400		-		0.400	1.680	2.080	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		41.813		-		41.813	Continuing	Continuing	N/A	
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

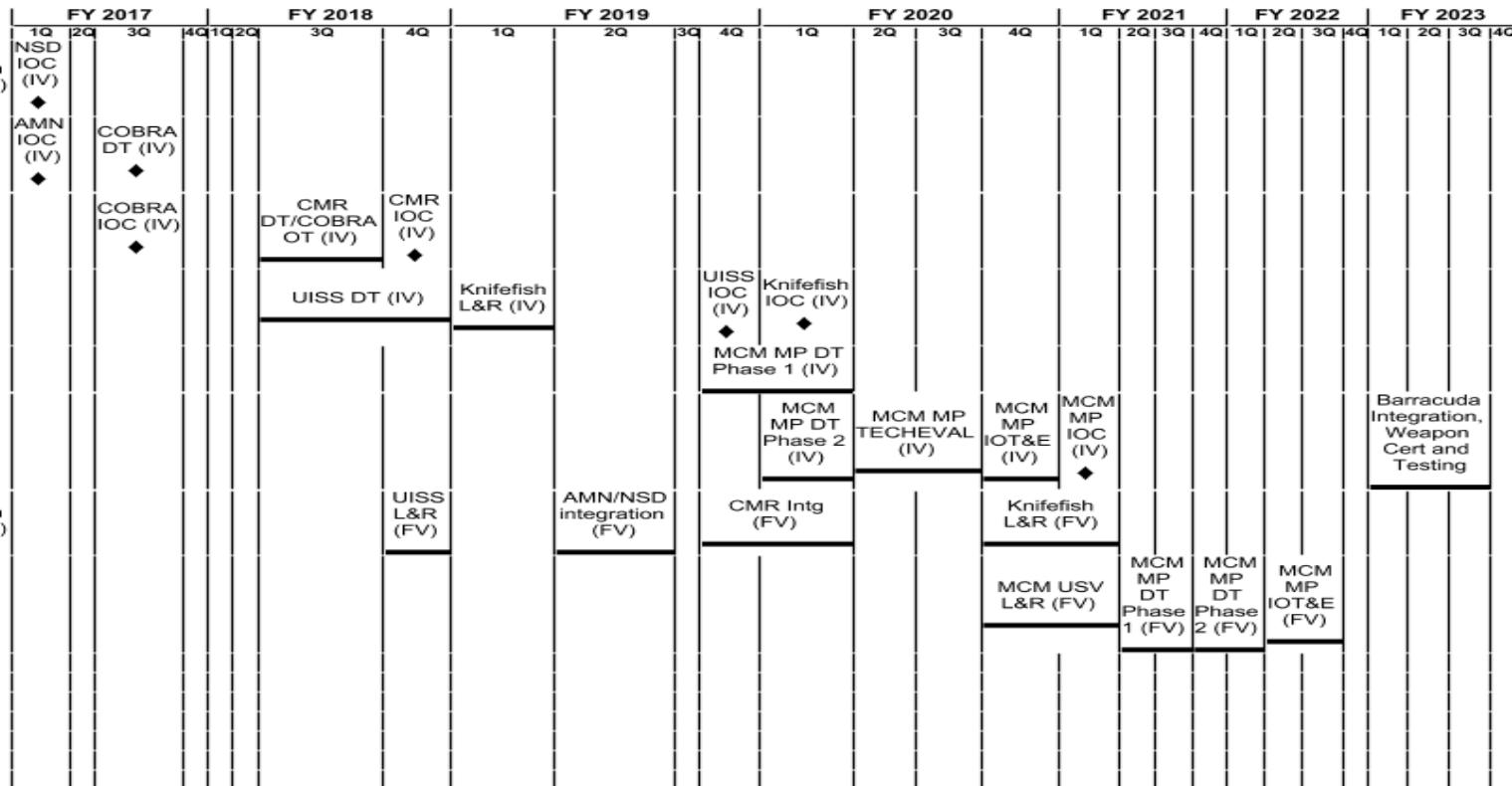
PE 0603596N / (U)LCS Mission Modules

Project (Number/Name)

2550 / Mine Countermeasure (MCM) Mission Package

Proj 2550

MCM Integration and Testing on Independence Variant (IV)



2019PB - 0603596N - 2550

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2550				
MCM Integration and Testing on Independence Variant (IV): NSD Mission Module (ALMDS) Certified for Operations (Indy Variant)	1	2017	1	2017
MCM Integration and Testing on Independence Variant (IV): AMN Mission Module (AMNS) Certified for Operations (Indy Variant)	1	2017	1	2017
MCM Integration and Testing on Independence Variant (IV): COBRA Mission System DT	3	2017	3	2017
MCM Integration and Testing on Independence Variant (IV): COBRA Mission System IOC	3	2017	3	2017
MCM Integration and Testing on Independence Variant (IV): CMR DT/COBRA at-Sea OT	3	2018	3	2018
MCM Integration and Testing on Independence Variant (IV): CMR Mission Module Certified for Operations	4	2018	4	2018
MCM Integration and Testing on Independence Variant (IV): UISS Mission System DT/ OA	3	2018	4	2018
MCM Integration and Testing on Independence Variant (IV): Knifefish L&R	1	2019	1	2019
MCM Integration and Testing on Independence Variant (IV): UISS Mission System IOC	4	2019	4	2019
MCM Integration and Testing on Independence Variant (IV): Knifefish Mission System IOC	1	2020	1	2020
MCM Integration and Testing on Independence Variant (IV): DT-B10 (Phase 1)	4	2019	1	2020
MCM Integration and Testing on Independence Variant (IV): DT-B10 (Phase 2)	1	2020	1	2020
MCM Integration and Testing on Independence Variant (IV): DT-C10 TECHEVAL	2	2020	3	2020
MCM Integration and Testing on Independence Variant (IV): OT-C10 IOT&E	4	2020	4	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	1	2021	1	2021
	1	2023	3	2023
	4	2018	4	2018
	2	2019	2	2019
	4	2019	1	2020
	4	2020	1	2021
	4	2020	1	2021
	2	2021	3	2021
	4	2021	1	2022
	2	2022	3	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603596N / (U)LCS Mission Modules				2551 / Anti-Submarine Warfare (ASW) Mission Package			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2551: Anti-Submarine Warfare (ASW) Mission Package	0.000	0.000	0.000	41.553	-	41.553	19.180	9.282	8.884	8.500	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 443												
A. Mission Description and Budget Item Justification												
Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:												
2550 Mine Countermeasures (MCM) Mission Package												
2551 Anti-Submarine Warfare (ASW) Mission Package												
2552 Surface Warfare (SUW) Mission Package												
3129 LCS Mission Package Development												
Prior to FY 2019 all Mission Package funding was in project 3129.												
The ASW MP enables LCS to conduct detect-to-engage operations against modern submarines that pose a threat. Specific ASW capabilities include protecting forces in transit, protecting joint operating areas, and establishing ASW barriers. The ASW MP provides the warfighter capabilities that can be employed for ASW area search as well as high value unit escort missions. Key components of the ASW MP include a Light Weight Tow torpedo countermeasure, a Variable Depth Sonar, a Multi-Function Towed Array and sonar signal processing. These individual systems are combined into three modules: Torpedo Defense Module; an ASW Escort Mission Module that provides High value unit escort capability; and an Aviation Module that offers airborne threat localization and engagement capability through a MQ-8B Fire Scout VTUAV and an MH-60R with MK54 torpedoes.												
This project will deliver the ASW Escort Mission Module Pre-Production Test Article (PPTA), the Torpedo Defense Module, and the Aviation Module in Q1FY19. Following the delivery, the ASW Mission Package will be installed on board Freedom Variant, and conducted subsequent Developmental Test & Evaluation (DT&E) and Initial Operational Test & Evaluation (IOT&E) and establish Initial Operational Capability (IOC) in FY19. In conjunction with integration and testing onboard a Freedom variant, the project will initiate shipboard integration of the Independence variant and will transition to production in FY19.												
ASW Mission Package will take advantage of improvements developed under the submarine Advanced Processing Build (APB), Advanced Surveillance Build (ASB) and Advanced Capability Build (ACB) and will in turn share unique improvements developed under this program with the submarine, cruisers, destroyers and surveillance ASW communities. All programs (ACB, ASB, and APB) are managed under a common development process and titled AxB. This will contribute to the development of Littoral Combat Ship (LCS) ASW Mission Packages and the Guided Missile Frigate FFG(X) Program. While the LCS ASW MP will retain its uniqueness, and focus												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018							
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules		Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package							
in functional domains essential to mission package success, a premium is placed on development of common capabilities and modular architecture technologies to maximize commonality and cost effectiveness.										
The Open System Architecture (OSA) and high performance COTS sonar processing hardware, as provided as an adjunct to the Mission Package Computing Environment (MPCE) will be fielded with the ASW Mission Package and will provide an opportunity to integrate emergent, transformational ASW technological improvements that were previously unachievable. The ASW Mission Package will require periodic upgrades to remain effective well into the 21st century and to pace the threat. Software upgrades target capability increases in high interest areas as prescribed by the Fleet and captured in campaign analysis. To achieve this, this project will package and deliver incremental upgrades every four years to the ASW Mission Package production program via an ACB development process by inserting maturing USW technologies and addressing hardware technology obsolescence.										
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Title: Anti-Submarine Warfare (ASW) Mission Modules	Articles:	0.000	0.000	41.553	0.000	41.553				
FY 2018 Plans: Funded under project 3129 LCS Mission Package Development.		-	-	-	-	-				
FY 2019 Base Plans: PREPARE AND CONDUCT FORMAL TESTING ON FREEDOM VARIANT: 1.) Complete System Qualification Testing (SQT) of the EMM module 2.) Deliver the ASW Mission Package to the Land Based Integration Test Site (LBITS) 3.) Conduct End-to-End testing at the Land Based Integration Test Site (LBITS) 4.) Embark the ASW Mission Package and conduct Installation Check Out (INCO) procedures 5.) Conduct Crew Training 6.) Conduct ASW Mission Package Readiness Assessment (MPRA) /Mission Readiness Assessment (MRA) and certification the package to start formal developmental and operational testing on Freedom variant. 7.) Conduct formal developmental testing, TECHEVAL, and IOT&E on Freedom variant to support ASW MP Initial Operational Capability (IOC).										
CONTINUE INTEGRATION OF ASW MP ON INDEPENDENCE VARIANT IN PREPARATION FOR FORMAL TESTING: 1.) Develop test requirements for the Independence Variant Ship Alteration (SHIPALT) 2.) Complete the Ship Installation Drawings (SIDs) 3.) Conduct ship checks										

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>4.) Complete development of ASW MP SHIPALT/PC for Independence variant in preparation for MP embark/debark and developmental and operational testing in FY 2020.</p> <p>5.) Work with shipbuilder to ensure work packages are developed and approved for execution during LCS Selected Restricted Availability (SRA) period.</p> <p>6.) Finalize safety analysis of the ASW equipment on the Independence variant.</p> <p>7.) Conduct ASW MP Weapon System Explosives Safety Review Board (WSESRB) to support ASW MP certification</p> <p>8.) Finalize testing objectives, performance prediction modeling, and test plans to support the execution of an ASW MP developmental and operational testing of the ASW MP on Independence variant in FY 2020.</p> <p>9.) Conduct at-sea end-to-end (E2E) integration testing on Independence variant hull to include ASW MP and combat system performance validation testing.</p> <p>In support of transitioning EMM to production in FY19, the project will conduct System Qualification Testing (SQT), System Verification Review (SVR), Functional Configuration Audit (FCA), Physical Configuration Audit (PCA), validate sonar acoustic performance, validate shipboard interfaces, validate launch, handling and recovery, and conduct embarks and debarks. The project will conduct a Production Readiness Review (PRR) in Q3FY19.</p> <p>Continue EMM acoustic processing software and hardware (ACB19 software and TI18 sonar signal processing hardware) which is a four-year cycle to address both software and hardware obsolescence.</p> <p>Complete development of ASW MP operator training materials and course curriculum to support Train to Qualify and Train to Certify requirements. Continue development of component and system level modeling and simulation capabilities to enable high fidelity virtual reality training. Deliver Operations and Maintenance and fundamental courseware to LCS Training Facility. Continue Factory training events in support of formal courseware development.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: In FY19, the project will be increasing activities in support of formal testing on the Freedom variant, initiating shipboard integration on the Independence variant and installation of the SHIPALT on the Independence Variant,</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
initiation of the ACB19/TI18 in coordination with PEO IWS 5 and conducting crew training to support ship deployments starting in FY22.											
In 2019, the ASW Mission Package will take advantage of improvements developed under the submarine Advanced Processing Build (APB), Advanced Surveillance Build (ASB) and Advanced Capability Build (ACB) and will in turn share unique improvements developed under this program with the submarine, cruisers, destroyers and surveillance ASW communities. All programs (ACB, ASB, and APB) are managed under a common development process and titled AxB. This will contribute to the development of Littoral Combat Ship (LCS) ASW Mission Packages and the Guided Missile Frigate (FFG(X)) Program. While the LCS ASW MP will retain its uniqueness, and focus in functional domains essential to mission package success, a premium is placed on development of common capabilities and modular architecture technologies to maximize commonality and cost effectiveness.											
Accomplishments/Planned Programs Subtotals						0.000	0.000	41.553	0.000	41.553	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 1600: LCS Common Mission Modules Equipment	14.670	34.666	46.732	-	46.732	51.553	36.657	55.776	29.787	734.284	1,427.898
• 1602: LCS ASW Mission Modules	0.000	0.000	57.294	-	57.294	52.754	63.181	34.104	34.777	142.398	384.508
Remarks											
D. Acquisition Strategy											
The LCS MM Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.											
E. Performance Metrics											
Program Completed Milestone B January 2014 Complete ASW MP DT, TECHEVAL, and IOT&E on Freedom variant Achieve ASW MP IOC on Freedom variant Complete ASW MP DT, TECHEVAL, and IOT&E on Independence variant											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	Sub Allot	PEO IWS 5E : Various	0.000	0.000		0.000		1.500	Nov 2018	-		1.500	0.000	1.500	-
2.0 ASW MP	WR	NUWC NPT : New Port RI	0.000	0.000		0.000		2.370	Nov 2018	-		2.370	Continuing	Continuing	Continuing
2.0 ASW MP	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.750	Dec 2018	-		0.750	0.000	0.750	-
2.0 ASW MP	WR	NUWC KPT : Keyport, Wa	0.000	0.000		0.000		0.500	Nov 2018	-		0.500	0.000	0.500	-
2.0 ASW MP	C/CPFF	Northrop Grumman : Bethpage, NU	0.000	0.000		0.000		2.800	Jan 2019	-		2.800	0.000	2.800	-
2.0 ASW MP	Sub Allot	PEO IWS 5A : Various	0.000	0.000		0.000		10.000	Mar 2019	-		10.000	Continuing	Continuing	Continuing
2.0 ASW MP	C/CPFF	CSRA : Washington, DC	0.000	0.000		0.000		0.255	Jan 2019	-		0.255	0.000	0.255	-
2.0 ASW MP	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		0.225	Nov 2018	-		0.225	0.000	0.225	-
2.0 ASW MP	WR	SUP SHIP Bath : Bath, Me	0.000	0.000		0.000		1.550	Oct 2018	-		1.550	0.000	1.550	-
2.0 ASW MP	MIPR	NAWC WD : Point Mugu, CA	0.000	0.000		0.000		0.410	Dec 2018	-		0.410	0.000	0.410	-
2.0 ASW MP	C/FFP	Raytheon : Portmonth, RI	0.000	0.000		0.000		4.210	Nov 2018	-		4.210	0.000	4.210	-
Subtotal			0.000	0.000		0.000		24.570		-		24.570	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP Test and Evaluation (Freedom)	WR	COMOPTEVFOR : Norfolk, VA	0.000	0.000		0.000		0.550	Oct 2018	-		0.550	0.000	0.550	-
2.0 ASW MP Test and Evaluation (Freedom)	WR	NSWC PHD : Port Hueneme, Ca	0.000	0.000		0.000		1.766	Dec 2018	-		1.766	0.000	1.766	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
2.0 ASW MP Test and Evaluation (Freedom)	WR	Range Service : Var*	0.000	0.000		0.000		3.154	Oct 2018	-		3.154	0.000	3.154	-	
2.0 ASW MP Test and Evaluation (Freedom)	WR	NUWC NPT : Newport, RI	0.000	0.000		0.000		7.362	Dec 2018	-		7.362	0.000	7.362	-	
2.0 ASW MP Test and Evaluation (Freedom)	WR	NUWC KPT : Keyport, Wa	0.000	0.000		0.000		2.600	Nov 2018	-		2.600	0.000	2.600	-	
2.0 ASW MP Test and Evaluation (Freedom)	C/CPFF	Raytheon : Portmonth, RI	0.000	0.000		0.000		1.000	Jan 2019	-		1.000	0.000	1.000	-	
Subtotal			0.000	0.000		0.000		16.432		-		16.432	0.000	16.432	N/A	
Remarks																
* Testing will be conducted at Nanoose, BC for Light Weight Tow testing and in Hawaii for ASW MP testing.																
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
2.0 ASW MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.000		0.551	Jan 2019	-		0.551	0.000	0.551	-	
Subtotal			0.000	0.000		0.000		0.551		-		0.551	0.000	0.551	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		0.000		41.553		-		41.553	Continuing	Continuing	N/A
Remarks																
Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:																
2550 Mine Countermeasures (MCM) Mission Package																
2551 Anti-Submarine Warfare (ASW) Mission Package																
2552 Surface Warfare (SUW) Mission Package																
3129 LCS Mission Package Development																

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy							Date: February 2018					
Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)						
1319 / 4			PE 0603596N / (U)LCS Mission Modules			2551 / Anti-Submarine Warfare (ASW) Mission Package						
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Prior to FY 2019 all Mission Package funding was in project 3129.												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

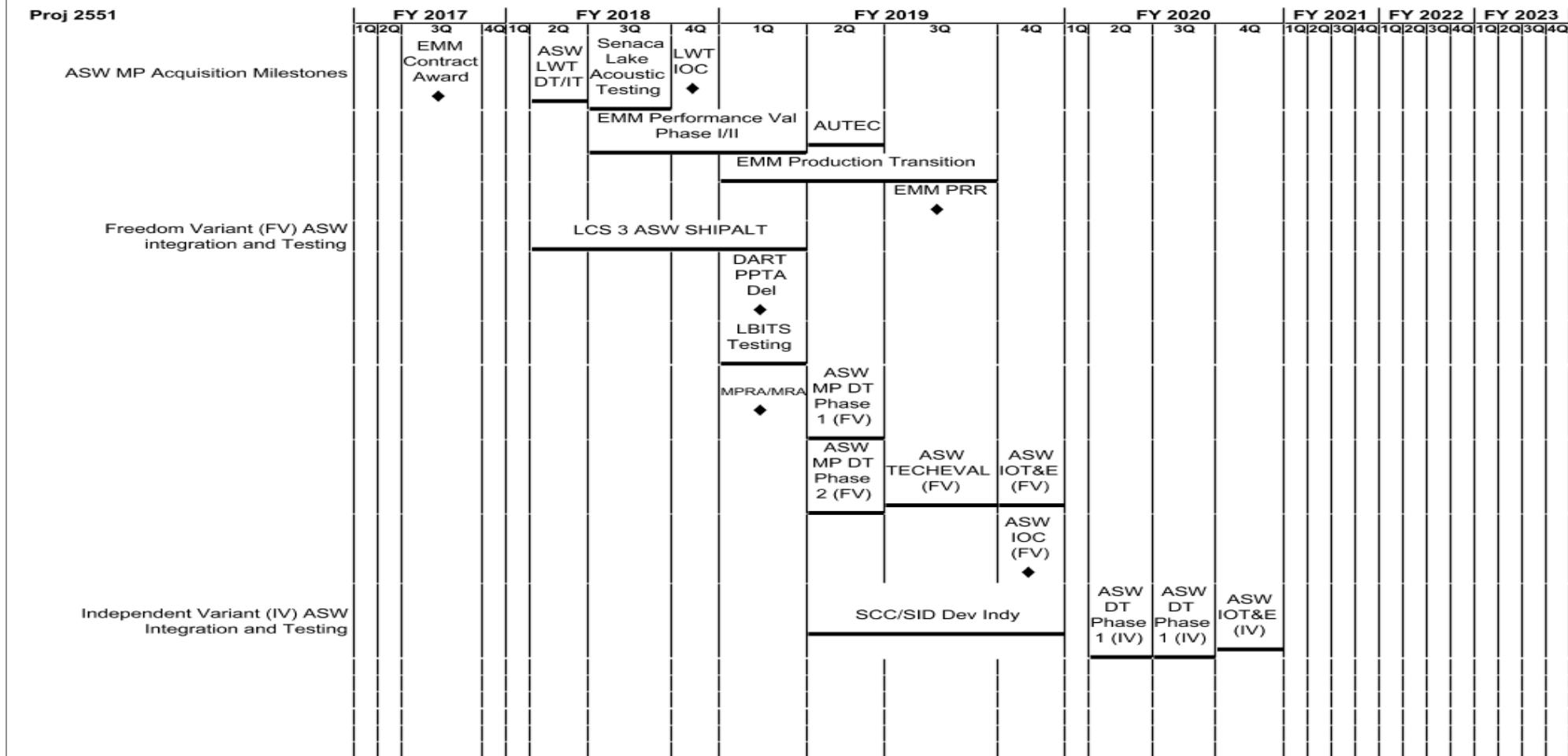
1319 / 4

R-1 Program Element (Number/Name)

PE 0603596N / (U)LCS Mission Modules

Project (Number/Name)

2551 / Anti-Submarine Warfare (ASW)
Mission Package



2019PB - 0603596N - 2551

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2551				
ASW MP Acquisition Milestones: EMM Contract Award	3	2017	3	2017
ASW MP Acquisition Milestones: ASW MP LWT Developmental Testing (DT/IT)	2	2018	2	2018
ASW MP Acquisition Milestones: ASW MP LWT IOC	4	2018	4	2018
ASW MP Acquisition Milestones: Acoustic Characterization Senaca Lake	3	2018	3	2018
ASW MP Acquisition Milestones: EMM Component and System Level Performance Validation Dock Side Testing	3	2018	1	2019
ASW MP Acquisition Milestones: White Ship Testing AUTEC	2	2019	2	2019
ASW MP Acquisition Milestones: EMM Production Transition	1	2019	3	2019
ASW MP Acquisition Milestones: EMM Production Readiness Review	3	2019	3	2019
Freedom Variant (FV) ASW integration and Testing: ASW SHIPALT Installation and INCO	2	2018	1	2019
Freedom Variant (FV) ASW integration and Testing: DART Pre-Production Test Article Delivery	1	2019	1	2019
Freedom Variant (FV) ASW integration and Testing: ASW MP Land Based Integration and Testing	1	2019	1	2019
Freedom Variant (FV) ASW integration and Testing: ASW Mission Package Readiness Assessment (MPRA)/Mission Readiness Assessment	1	2019	1	2019
Freedom Variant (FV) ASW integration and Testing: ASW MP DT-B3 Phase 1	2	2019	2	2019
Freedom Variant (FV) ASW integration and Testing: ASW MP DT-B3 Phase 2	2	2019	2	2019
Freedom Variant (FV) ASW integration and Testing: ASW MP DT/IT-C3 TECHEVAL	3	2019	3	2019
Freedom Variant (FV) ASW integration and Testing: ASW MP OT-C3	4	2019	4	2019
Freedom Variant (FV) ASW integration and Testing: ASW IOC	4	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package			
Events by Sub Project	Start		End		
	Quarter	Year	Quarter	Year	
	Independent Variant (IV) ASW Integration and Testing: ASW Mission Package SCD/SID development for Independence	2	2019	4	2019
	Independent Variant (IV) ASW Integration and Testing: ASW MP DT-B6 Phase 1	2	2020	2	2020
	Independent Variant (IV) ASW Integration and Testing: ASW MP DT-B6 Phase 2	3	2020	3	2020
Independent Variant (IV) ASW Integration and Testing: ASW MP OT-C6	4	2020	4	2020	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603596N / (U)LCS Mission Modules				2552 / Surface Warfare (SUW) Mission Package				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2552: Surface Warfare (SUW) Mission Package	0.000	0.000	0.000	11.368	-	11.368	1.558	0.000	0.000	0.000	0.000	12.926	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 443

A. Mission Description and Budget Item Justification

Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:

2550 Mine Countermeasures (MCM) Mission Package

2551 Anti-Submarine Warfare (ASW) Mission Package

2552 Surface Warfare (SUW) Mission Package

3129 LCS Mission Package Development

Prior to FY 2019 all Mission Package funding was in project 3129.

The SUW MP increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes and move a force quickly through a choke point or other strategic waterway. The SUW MP is comprised of several modules including the Gun Mission Module (GMM), the Aviation Module, the Maritime Security Module (MSM), and the Surface-to-Surface Missile Module (SSMM). The GMM is comprised of two high velocity 30mm cannons and is augmented with the ship's 57mm gun to counter close in to mid-range threats. The Aviation Module uses the embarked MH-60R helicopter with Hellfire missile and the MQ-8B Fire Scout VTUAV for the detection, identification, and classification of surface contacts and to engage long range threats. The MSM supports the embarkation of a Visit, Board, Search, and Seizure (VBSS) team. The SSMM is a self-contained module consisting of 2 Missile Exhaust Containment Structures (MECS), integrated articulating hatch covers, a fire control system, and 12 two-rail M299 launchers to support load out and firing of 24 longbow hellfire missiles. SSMM provides missile coverage for mid-range threats and small boats.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Surface Warfare (SUW) Mission Modules	0.000	0.000	11.368	0.000	11.368
Articles:	-	-	-	-	-
FY 2018 Plans: Funded under project 3129 LCS Mission Package Development.					
FY 2019 Base Plans: Complete IOT&E and establish IOC Q1FY19.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018				
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules			Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package									
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Conduct Find, Fix, Repair efforts of SSMM EDM-2 to resolve issues found during Freedom variant testing and complete test reports.														
Complete integration of SSMM with Independence variant Combat Management System (CMS), obtain WSESRB/SSSTRP approvals, and IA approvals necessary for formal shipboard testing on Independence variant.														
Conduct analysis of test objectives and associated Measures of Effectiveness (MOEs) targeted for SSMM testing onboard Independence variant in support of developmental testing.														
Assess performance envelope capabilities and conduct DOE testing. Conduct a TRACKEX, Structural Test Firing (STF), and a formal Developmental Test event on Independence variant.														
Integrate SUW SSMM into Common Mission Package Trainer (CMPT) (2.4.4) for Independence variant. Develop and deliver courses and necessary updates to Common Skills, SUW Skills, and SSMM O&M training in support of ready for training in FY 2020.														
FY 2019 OCO Plans: N/A														
FY 2018 to FY 2019 Increase/Decrease Statement: Prior efforts for SUW are contained in 3129. SUW funding decreased from FY18 to FY19 as developmental efforts are completing and formal testing is beginning.														
Accomplishments/Planned Programs Subtotals										0.000	0.000	11.368	0.000	11.368
C. Other Program Funding Summary (\$ in Millions)											Cost To Complete		Total Cost	
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete				
• 1600: LCS Common Mission Module Equipment	14.670	34.666	46.732	-	46.732	51.553	36.657	55.776	29.787	734.284			1,427.898	
• 1603: LCS SUW Mission Module	21.064	52.960	26.006	-	26.006	26.566	15.342	15.711	52.511		5.104		315.024	
• 4221: LCS Module Weapons	2.776	13.110	11.350	-	11.350	14.585	14.417	13.825	14.103		37.555		121.721	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules			Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package						
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Remarks											
D. Acquisition Strategy											
The LCS MM Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.											
E. Performance Metrics											
Program Completed Milestone B January 2014 Complete SUW MP DT, TECHEVAL, and IOT&E on Freedom variant Complete SUW MP DT, TECHEVAL, and IOT&E on Independence variant											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018		
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules						Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package		
Product Development (\$ in Millions)														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	MIPR	JAMS PO : Various	0.000	0.000		0.000		1.350	Jan 2019	-	1.350	0.000	1.350	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		5.098	Nov 2018	-	5.098	0.000	5.098	-
3.0 SUW MP	C/CPIF	Northrop Grumman : Bethpage, NY	0.000	0.000		0.000		0.800	Dec 2018	-	0.800	0.000	0.800	-
Subtotal			0.000	0.000		0.000		7.248		-	7.248	0.000	7.248	N/A
Test and Evaluation (\$ in Millions)														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	Sub Allot	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		2.720	Nov 2018	-	2.720	0.000	2.720	-
3.0 SUW MP	WR	NSWC Corona : Corona, CA	0.000	0.000		0.000		0.950	Jan 2019	-	0.950	0.000	0.950	-
Subtotal			0.000	0.000		0.000		3.670		-	3.670	0.000	3.670	N/A
Management Services (\$ in Millions)														
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.000		0.450	Jan 2019	-	0.450	0.000	0.450	-
Subtotal			0.000	0.000		0.000		0.450		-	0.450	0.000	0.450	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Project Cost Totals			0.000	0.000		0.000		11.368		-	11.368	0.000	11.368	N/A
Remarks														

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

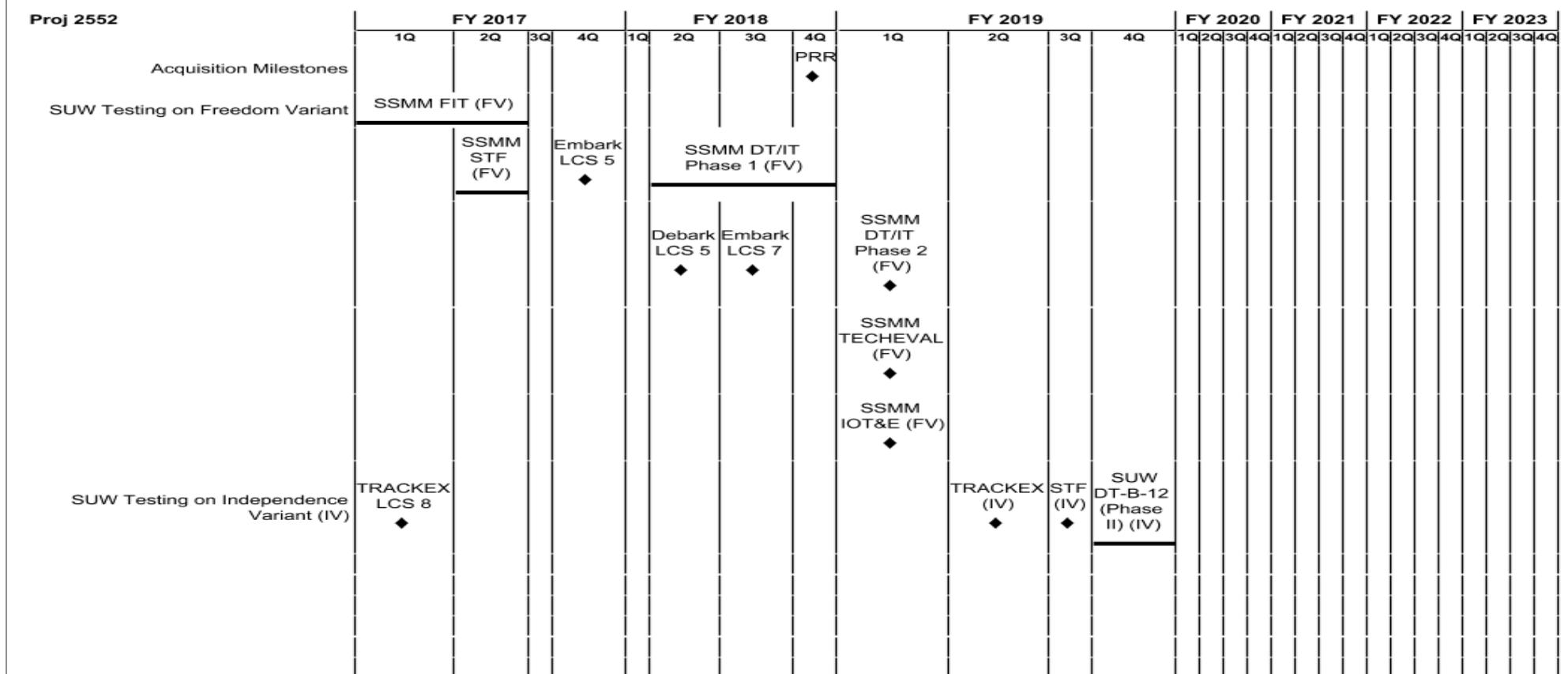
1319 / 4

R-1 Program Element (Number/Name)

PE 0603596N / (U)LCS Mission Modules

Project (Number/Name)

2552 / Surface Warfare (SUW) Mission Package



2019PB - 0603596N - 2552

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2552				
Acquisition Milestones: Production Readiness Review	4	2018	4	2018
SUW Testing on Freedom Variant: Surface-to-Surface Missile Module Functional Integration Test (FIT) (Free Var)	1	2017	2	2017
SUW Testing on Freedom Variant: SSMM Structural Test Fire (STF) (Free Var)	2	2017	2	2017
SUW Testing on Freedom Variant: Embark on LCS 5	4	2017	4	2017
SUW Testing on Freedom Variant: SSMM DT / IT Phase 1 (Free Var)	2	2018	4	2018
SUW Testing on Freedom Variant: Debark on LCS 5	2	2018	2	2018
SUW Testing on Freedom Variant: Embark LCS 7	3	2018	3	2018
SUW Testing on Freedom Variant: SSMM DT / IT Phase 2 (Free Var)	1	2019	1	2019
SUW Testing on Freedom Variant: SSMM TECEVAL (Free Var)	1	2019	1	2019
SUW Testing on Freedom Variant: SSMM IOT&E (Free Var)	1	2019	1	2019
SUW Testing on Independence Variant (IV): FIT Check & TRACKEX	1	2017	1	2017
SUW Testing on Independence Variant (IV): TRACKEX	2	2019	2	2019
SUW Testing on Independence Variant (IV): Structural Test Fire (STF)	3	2019	3	2019
SUW Testing on Independence Variant (IV): SUW Development Testing DT-B12	4	2019	4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3129: <i>LCS Mission Package Development</i>	371.619	153.595	116.871	8.899	-	8.899	10.311	9.356	9.254	9.410	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Project MDAP/MAIS Code: 443

A. Mission Description and Budget Item Justification

Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:

2550 Mine Countermeasures (MCM) Mission Package

2551 Anti-Submarine Warfare (ASW) Mission Package

2552 Surface Warfare (SUW) Mission Package

3129 LCS Mission Package Development

Prior to FY 2019 all Mission Package funding was in project 3129.

FY 2018 and Prior:

The SUW MP increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes and move a force quickly through a choke point or other strategic waterway. The SUW MP is comprised of several modules including the Gun Mission Module (GMM), the Aviation Module, the Maritime Security Module (MSM), and the Surface-to-Surface Missile Module (SSMM). The GMM is comprised of two high velocity 30mm cannons and is augmented with the ship's 57mm gun to counter close in to mid-range threats. The Aviation Module uses the embarked MH-60R helicopter with Hellfire missile and the MQ-8B Fire Scout VTUAV for the detection, identification, and classification of surface contacts and to engage long range threats. The MSM supports the embarkation of a Visit, Board, Search, and Seizure (VBSS) team. The SSMM is a self-contained module consisting of 2 Missile Exhaust Containment Structures (MECS), integrated articulating hatch covers, a fire control system, and 12 two-rail M299 launchers to support load out and firing of 24 longbow hellfire missiles. SSMM provides missile coverage for mid-range threats and small boats.

The ASW MP enables LCS to conduct detect-to-engage operations against modern submarines that pose a threat. Specific ASW capabilities include protecting forces in transit, protecting joint operating areas, and establishing ASW barriers. The ASW MP provides the warfighter capabilities that can be employed for ASW area search as well as high value unit escort missions. Key components of the ASW MP include a Light Weight Tow torpedo countermeasure, a Variable Depth Sonar, and a Multi-Function Towed Array. These individual systems are combined into three modules: Torpedo Defense Module; an ASW Escort Mission Module that provides High value unit escort capability; and an Aviation Module that offers airborne threat localization and engagement capability through a MQ-8B Fire Scout VTUAV and an MH-60R with MK54 torpedoes.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
The LCS Mine Countermeasures (MCM) MP will counter deep, shallow, and tethered mines in the littoral without putting Sailors in the minefield. When the MCM MP is embarked, LCS is capable of conducting detect-to-engage operations (hunting, sweeping, and neutralization) against very shallow and deep-water sea mine threats. The MCM MP provides these capabilities through the use of sensors and weapons deployed from an MH-60S multi-mission helicopter, unmanned off-board vehicles, and support equipment/containers. The MCM MP consists of the following modules:						
<ul style="list-style-type: none"> - Remote Minehunting (RMH) Module: MCM Unmanned Surface Vehicle (MCM USV) + AN/AQS-20 Minehunting Sonar - Coastal Mine Reconnaissance (CMR) Module: Coastal Battlefield Reconnaissance & Analysis (COBRA) + MQ-8B Fire Scout Vertical Take-off and Landing Tactical Unmanned Aerial Vehicle (VTUAV) - Near Surface Detection (NSD) Module: Airborne Laser Mine Detection System (ALMDS) + MH-60S Helicopter - Airborne Mine Neutralization (AMN) Module: Airborne Mine Neutralization System (AMNS) + MH-60S Helicopter - Unmanned Minesweeping (UMS) Module: Unmanned Influence Sweep System (UISS) (MCM USV + Unmanned Surface Sweep System) - Buried Minehunting (BMH) Module: Knifefish Unmanned Underwater Vehicle (UUV) 						
The RMH Module provides sustained mine hunting and clearing from the surface, the UMS Module provides endurance bottom sweep capability, the CMR Module will allow detection of minefield patterns and obstacles from an embarked Fire Scout VTUAV in the beach zone, and the BMH Module will allow detection of buried mines. When complete, the MCM MP will provide full capability against floating, tethered, bottom, and buried mines.						
FY 2019 funding includes:						
The LCS MM Common Equipment consists of enabling products required by all MPs to provide common hardware interfaces, computer operating environment, communications systems, aviation interface systems, and portable development & integration test-sets. Common hardware interfaces include definition, installation, and control of mechanical, electrical, and cooling requirements common to all mission packages. The Mission Package Computing Environment (MPCE) provides common services and Operating Environment to support all Mission Package Application Software and Open Architecture Products. The Multi-Vehicle Communications System (MVCS) enables the control and data exchange of simultaneous unmanned mission vehicles and the Ship. Aviation interface systems include integration and management of data communications, data processing, and physical hardware interfaces such as common equipment and containers used by all mission packages. Development and integration test-sets provide a mobile operating environment installed in the Mission Package Portable Control Stations (MP-PCS) to serve as a surrogate Ship during mission package development and integration test events at test ranges.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Mine Countermeasure (MCM) Mission Package	Articles:	38.892	21.852	0.000	0.000	0.000
FY 2018 Plans: For the Mine Countermeasures (MCM) Mission Package (MP), certify Airborne Mine Neutralization (AMN) and Near Surface Detection (NSD) Modules and employ on LCS Independence variant. Commence integration of AN/AQS-20C and MCM USV+hunt into MCM MP.		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	For the MCM MP Coastal Mine Reconnaissance (CMR) module, complete at-sea Developmental Testing (DT) and COBRA Operational testing (OT) on Independence Variant. Conduct CMR cyber testing. Certify CMR module and employ on LCS Independence variant. Integrate CMR Post Mission Analysis (PMA) workstation on Freedom Variant. Modify Mission Package Application Software (MPAS) 1.7.0.0 software incorporating correction of software Problem Trouble Reports (PTRs) identified during CMR DT.					
	For the MCM MP Unmanned Mine-sweeping (UMS) Module, integrate Unmanned Influence Sweep System (UISS) into MCM MP. Conduct Independence variant Launch and Recovery (L&R) capture line mechanism testing. Conduct UISS testing into MCM MP. Deliver MPAS 2.0.0.0.					
	In support of MCM MP, commence development of MCM MPAS build 3.0.0.0 incorporating Net-Centric Sensor Analysis for MIW (NSAM) software and Cyber-security Toolkit (CSTK). Perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management and Integrated Logistics Support. Develop common Post Mission Analysis hardware for Organic Post Mission Analysis (OPMA), NSAM, COBRA and Knifefish PMA. Continue to compile system and package level Reliability and Maintainability (RAM-C) data to support reliability engineering and a prioritized initial spares list. Perform Full Operational Capability (FOC) RAM-C analysis with updated data and update RAM-C Rationale Report. Continue MCM MP FRACAS effort.					
FY 2019 Base Plans:	Funded under Project Unit (PU) 2550 for FY 2019.					
FY 2019 OCO Plans:	N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:	FY19 efforts have been moved to Project 2550					
Title: Anti-Submarine Warfare (ASW) Mission Package	Articles:	29.541	49.868	0.000	0.000	0.000
FY 2018 Plans:	FY 2018 plan updated to reflect programmatic changes due to the competitive award of the Escort Mission Module development and production contract. The contract was still under evaluation at the time of the PB18 submit and the program was unable to document the schedule forward until the down-select was complete. The following reflects those changes.	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management and Integrated Logistics Support. Continue to compile system and package level Reliability and Maintainability (RAM-C) data to support reliability engineering and a prioritized initial spares list. Perform Full Operational Capability (FOC) RAM-C analysis with updated data and update RAM-C Rationale Report. Continue ASW MP FRACAS effort.	Continue development of ASW MP operator training materials and course curriculum to support Train to Qualify and Train to Certify requirements. Continue development of component and system level modeling and simulation capabilities to enable high fidelity virtual reality training. Deliver Operations and Maintenance and fundamental courseware to LCS Training Facility. Continue Factory training events in support of formal courseware development.					
ASW Mission Package Engineering Reviews: 1.) Close-out ASW MP Preliminary Design Review (PDR) by completing engineering efforts to resolve or adjudicate critical Request for Actions (RFA). 2.) Prepare detailed Technical Data package (TDP) to support ASW MP Critical Design Review (CDR) event. Conduct CDR and close-out ASW MP CDR by completing efforts to resolve or adjudicate critical Request for Actions (RFA).	Prepare to deliver and install Escort Mission Module (EMM) on LCS 3 and prepare for formal ASW MP testing which will begin in FY 2019: 1.) Continue development of EMM Pre-Production Test Article (PPTA) through contractor level testing on EMM contract. Participate in EMM design reviews and feasibility testing to verify performance. Continue ship integration activities required to enable hardware installation of EMM equipment onboard LCS platforms. 2.) Exercise EMM contract Integration and Testing Support CLIN in support of ship and mission module Integration, Testing, Validation and Verification (V&V), Certification and Delivery. 3.) Oversee and support execution of shipboard industrial work in accordance with ASW MP Ship Alteration Permanent Change (SHIPALT/PC) Technical Data Package (TDP) and any additional MM installation ECPs					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
as necessary to support ASW MP Installation and deployment on LCS. Complete SHIPALT/PC for Freedom variant and initiate development of SHIPAL/PC for Independence variant.						
4.) Finalize safety analysis of the ASW equipment on the Freedom variant and begin detailed safety analyses on the Independence variant. Conduct ASW MP Weapon System Explosives Safety Review Board (WSESRB) to support ASW MP certification to be conducted in FY 2019 to support formal test on Freedom variant.						
5.) Finalize testing objectives, performance prediction modeling, and test plans to support the execution of an ASW MP developmental and operational testing of the ASW MP on Freedom variant in FY 2019.						
6.) Conduct mission module and mission package level integration testing, including events at PAX River SAIL for Aviation integration, Combat Management System (CMS) integration and performance validation testing in support of ASW MP.						
7.) Plan and conduct ASW MP Land Based and at-sea end-to-end (E2E) integration testing on Freedom variant hull to include ASW MP and combat system performance validation testing.						
8.) Complete EMM acoustic processing software and hardware (ACB13L software and TI14 hardware), Aviation integration support software, and Command and Control software development to support software certification in FY 2019 to support formal developmental and operational testing. Initiate development of ACB19/TI18 to support production buys.						
Complete development and install Torpedo Defense Module on Freedom Variant:						
1.) Integrate Torpedo Defense Module (Light Weight Tow) EDM units onto each LCS variant with Class I (PCW/SCD) changes. Complete installation of equipment on LCS 1 and LCS 3.						
2.) Conduct initial integration and proof of performance testing of the Light Weight Tow system. Testing to be performed aboard LCS platforms at the Canadian Fleet Maritime Experimental Testing Range (CFMETR) against instrumented torpedoes.						
3.) Develop production data package for Torpedo Defense Module to support a production contract RFP and award in FY 2019.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Develop the products necessary for mission package turnover to sustainment, such as Provisioning Technical Documents, Class Maintenance Plan (CMP), Diminishing Manufacturing Sources/Material Sources (DMSMS) Plan, embark/debark procedures, Consolidated Shipboard Allowance List (COSAL), Navy Training System Plan (NTSP), and Depot Source of Repair (DSOR).				
FY 2019 Base Plans: Funded under Project Unit (PU) 2551 for FY 2019.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Effort beyond FY18 are funded under Project Unit (PU) 2551.				
Title: Surface Warfare (SUW) Mission Package	Articles: -	42.552	17.647	0.000
FY 2018 Plans: Continue to conduct combat system certification, MP certification, obtain WSESRB/SSSTRP approvals, and IA approvals in for completion of formal shipboard test events.		-	-	-
Start formal shipboard Developmental Testing DT/IT-B11 (Phase I) on LCS 5 and after debarking from LCS 5 and embarking on LCS 7 the project will complete DT/IT-B11 (Phase I), complete all test planning and procedures for DT-C11 (TECHEVAL), and Operational Testing OT-C11 (IOT&E) in support of testing in Q1FY19.				
In support of transitioning SSMM to production in FY18, the project will conduct System Qualification Testing (SQT), System Verification Review (SVR), Functional Configuration Audit (FCA), Physical Configuration Audit (PCA), validate sonar acoustic performance, validate shipboard interfaces, validate launch, handling and recovery, and conduct embarks and debarks. The project will conduct a Production Readiness Review (PRR) in Q4FY18.				
Complete FMECA, LORA, and MTA associated with maturity levels of development EDM-2. Complete RCM analysis for finalizing MIPs, MRCs upon finalizing EDM to contribute to development of Technical Manuals. Conduct Reliability, Maintainability, and Availability efforts in support of Freedom variant IOC. Conduct ILS support efforts in support of Freedom variant to include SSMM Provisioning, Supply Support, PHS&T, Preliminary AL, APL, CSOSS, data management and delivery of preliminary EOD 60 series manual. Finalize SSMM development, verification, validation and delivery of final tech manuals. Continue to develop I-level				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Technical Manual for Incr. III SSMM, M299 and MECS. Develop SSMM Embark/Debark plan. Continue development of SSMM Operations and Maintenance Technical Manual. Continue development of SSMM facilities requirements. Complete PHS&T plan update with SSMM data. Complete SSMM O&M Training plan and update course development. Finalize M299 TM in compliance with O and I level requirements. Complete SERD, including I level requirements. Complete SSMM facilities requirements. Finalize all loading procedures/methods.						
Integrate SSMM into Common Mission Package Trainer (CMPT) (2.4.4) for Freedom variant. Develop and deliver courses and necessary updates to Common Skills, SUW Skills, and SSMM O&M in support of ready for training.						
Continue PR resolution and analysis of GD ROM in support of SSMM integration of ICMS aboard Independence Variant						
Continue to compile system and package level Reliability and Maintainability (RAM-C) data to support reliability engineering and a prioritized initial spares list. Perform FOC RAM-C analysis with updated data and update RAM-C Rationale Report. Continue SUW MP FRACAS effort.						
FY 2019 Base Plans: Funded under Project Unit (PU) 2552 for FY 2019.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Effort beyond FY18 are funded under Project Unit (PU) 2552						
Title: Command, Control, Communication, Computers, Cyber and Intelligence (C5I) and Mission Package Tactical Team Trainers	Articles:	8.554	10.082	8.899	0.000	8.899
FY 2018 Plans: Mission Package Computing Environment (MPCE): Continue to conduct MPCE Modernization and Technology Refresh efforts. Conduct Formal MPCE v1.10 Critical Design Review (CDR) and factory training. Conduct MPCE grooming to support MCM, ASW and SUW MP test events. Transition to a common Mission Package Operating Environment (MPOE) / Mission Package Services (MPS) software baseline.		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Finalize Program Protection Plan.						
Conduct Maintenance Demonstration (M-DEMO) to validate the effectiveness and execution performance of the delivered technical documentation and the Maintenance planning products.						
Multi Vehicle Communications System (MVCS): Finalize and deliver the MVCS v1.2 baseline resulting in an ECP and SCD package. Continue on the design and development of MVCS v1.2.X to implement the CDS hardware replacement due to the existing solution reaching end of life and the implementation of the IPS-250 Inline Encryptor. Support efforts to implement crypto and the replacement CDS on Unmanned Influence Sweep System (UISS) and Knifefish Unmanned Undersea Vehicle. Groom MVCS v1.2 for integration and perform pre-integration activities aboard the Freedom variant LCS 3 in preparation for MVCS v1.2 installation in support of UISS testing. Develop and install solution to provide SIPRNet access aboard the Freedom variant. Finalize development and complete the Seminal Transition Event test to close out the RT-1944A/U Rapid Innovation Fund project. Continue development efforts of the Beyond Line of Site (BLOS) capability provided by the High Frequency Ground Wave (HFGW) system to include integrating the HFGW into the MVCS. Perform Topside Analysis of both LCS variants to determine antenna location and performance in support of the HFGW system. Complete the Spectrum Supportability Risk Assessment for implementing the HFGW on the ship. Continue development on the Extended Line of Site (ELOS) solution Unmanned Aerial Relay (UMAR) Rapid Innovation Fund effort. Continue development of the Anti-Jam MAGIC SHIELD solution for integration into the RT-1944A/U. Perform an analysis to determine the amount of bandwidth required for remote mine hunting at various operating distances. Begin efforts to define and develop MVCS v1.3. Continue to conduct Tech Refresh/Insertion studies needed to sustain incremental MVCS capability upgrades. Provide curriculum development for the MVCS v1.2 baseline.						
Provide differences training on MVCS to fleet and curriculum updates for Combat Systems courses.						
Common Mission Package Trainer (CMPT): Complete incremental update to integrate MCM MP Coastal Mine Reconnaissance (CMR) Module and SUW Surface-to-Surface Missile Module (SSMM) capabilities into CMPT. Complete integration of updated software with Freedom and Independence Combat Management System Trainers and conduct standalone and integrated team training at LTF for detachments. Begin update to integrate MCM Unmanned Sweep Module and Remote Minehunting Module capabilities into CMPT. Begin update to integrate ASW Escort Mission Module, Torpedo Defense Module, and Aviation Module capabilities into CMPT.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
	Continue to compile system data to support Reliability and Maintainability (RAM-C) data to support reliability engineering and analysis. Begin FRACAS effort.					
FY 2019 Base Plans: Finalize the design and development of MVCS v1.2.X to implement the CDS hardware replacement due to the existing solution reaching end of life and the implementation of the IPS-250 Inline Encryptor. Complete development to update the Ship Configuration Agent (SCA) as part of the MVCS 1.2.X baseline due to integration with the Knifefish, UISS and MCM USV. Finalize the development of the Anti-Jam MAGIC SHIELD solution for procurement and integration into the RT-1944A/U. Complete development required to support the MVCS v1.2.X for Integration Test. Continue development efforts of the Beyond Line of Site (BLOS) capability provided by the High Frequency Ground Wave (HFGW) system to include beginning the fabrication of 3 Engineering Development Models (EDMs), adding Emission Control (EMCON), providing spectrum and topside analysis support, begin adaptive noise cancelling firmware development, complete Performance Monitor Fault Location (PMFL) and Built In Test (BIT) design and implementation, conduct an Electromagnetic Interference (EMI) test, perform an initial Anti?Jam antenna and signal assessment, begin test fixture software for production, provide support for MVCS/Seaframe integration and CDS rule-set reprogramming, initiate Freedom variant and USV/UISS Noise assessment, and conduct an Engineering Sea test. Continue development on the Extended Line of Site (ELOS) solution Unmanned Aerial Relay (UMAR) Rapid Innovation Fund effort. Continue to conduct Tech Refresh/Insertion studies needed to sustain incremental MVCS capability upgrades. Develop MVCS differences training and deliver for inclusion in LCS Combat Systems courses. Common Mission Package Trainer (CMPT): Update CMPT to integrate MCM Unmanned Sweep Module, Remote Minehunting Module, and begin integration of Buried Minehunting Module capabilities. Complete update to incorporate ASW Escort Mission Module, Torpedo Defense Module, and Aviation Module capabilities. Continue to integrate updated software with Freedom and Independence variant Combat Management System Trainers and conduct standalone and integrated team training at LTF for detachments. Continue to compile system data to support Reliability and Maintainability (RAM-C) data to support reliability engineering and analysis. Continue FRACAS effort.						
FY 2019 OCO Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
1319 / 4	PE 0603596N I (U)LCS Mission Modules	3129 / LCS Mission Package Development			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: In FY18 MPCE transitioned to Sustainment.					
Title: System Engineering and Program Acquisition Articles:	34.056	17.422	0.000	0.000	0.000
FY 2018 Plans: Systems Engineering Efforts: Support all major planned systems engineering events per the LCS Mission Modules Systems Engineering Plan (SEP) for all modules within the three warfare areas (Surface Warfare, Anti-Submarine Warfare, and Mine Countermeasures Warfare). Continue to develop and implement process to track lead/lag systems engineering metrics to include requirements, Requirements Traceability & Verification Matrix (RTVM), and SRLs and continued to implement the Technical Performance Measurement (TPM) Plan. Continue to maintain and execute Cyber Security Strategy. Program Management Efforts: Conduct business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives that are not associated with specific hardware elements or included in systems engineering. Common Training Management Efforts: Continue executing four training Integrated Project Teams (IPTs): MCM, SUW, ASW, and Common systems. Continued development of training and training systems for MCM, ASW, and SUW Mission Module Sailors in accordance with Navy Training Support Plan (NTSP). Begin incorporation of SUW Surface-to-Surface Missile Module capability into LCS Training Facility (LTF) training courses to meet SUW MP Train to Certify (T2C) requirement and achieve Ready for Training (RFT) in FY 2020.	-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018							
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules			Project (Number/Name) 3129 / LCS Mission Package Development												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Begin development of ASW MP Escort Mission Module and Torpedo Defense capabilities into LTF training courses to meet ASW MP T2C requirement and achieve RFT in FY 2020.																	
Begin incorporation of MCM Buried Minehunting, Unmanned Sweep, and Remote Minehunting Module capabilities into LTF training courses to meet MCM MP T2C requirement and achieve RFT in FY 2021.																	
Perform vendor and interim training in preparation for deployment.																	
Perform analysis of training to validate effective training delivery and updated formal curriculum to incorporate findings from program test events, operations and classroom experience to deliver training that will achieve Train to Certify KPP.																	
Continue to integrate LCS MM program training with LCS platform program training.																	
FY 2019 Base Plans: N/A																	
FY 2019 OCO Plans: N/A																	
FY 2018 to FY 2019 Increase/Decrease Statement: Beginning in FY19, all systems engineering and program management efforts have been aligned to the specific mission packages (Project 2550 for MCM, Project 2551 for ASW, and Project 2552 for SUW).																	
Accomplishments/Planned Programs Subtotals										153.595	116.871	8.899	0.000	8.899			
C. Other Program Funding Summary (\$ in Millions)																	
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost						
• 1600: LCS Common Mission Modules Equipment	14.670	34.666	46.732	-	46.732	51.553	36.657	55.776	29.787	734.284	1,427.898						
• 1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,403.599	2,673.330						
• 1602: LCS ASW Mission Modules.	0.000	0.000	57.294	-	57.294	52.754	63.181	34.104	34.777	142.398	384.508						
• 1603: LCS SUW Mission Modules	21.064	52.960	26.006	-	26.006	26.566	15.342	15.711	52.511	5.104	315.024						
• 4221: LCS Module Weapons	2.776	13.110	11.350	-	11.350	14.585	14.417	13.825	14.103	37.555	121.721						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development			
C. Other Program Funding Summary (\$ in Millions)							FY 2019	FY 2019	FY 2019	Cost To Complete	
Line Item	FY 2017	FY 2018	Base	OCO	Total	FY 2020	FY 2021	FY 2022	FY 2023	Total Cost	
Remarks											
D. Acquisition Strategy The LCS Mission Module Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.											
E. Performance Metrics Program Completed Milestone B January 2014 Complete SUW MP DT, TECHEVAL, and IOT&E on Freedom variant Achieve SUW MP Initial Operational Capability (IOC) on Freedom variant Achieve MCM MP IOC on Independence variant (Refer to Project Unit 2550) Achieve ASW MP IOC on Freedom variant (Refer to Project Unit 2551)											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules					Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.1 System Engineering	WR	NSWC PCD : Panama City, FL	0.000	0.000		0.275	Oct 2017	0.000		-		0.000	0.000	0.275	-
6.1 System Engineering	WR	NSWC DD : Dahlgren, VA	0.000	1.031	Nov 2016	0.753	Oct 2017	0.000		-		0.000	0.000	1.784	-
6.1 System Engineering	WR	NAVSEALOGCEN : Norfolk, VA	0.731	0.620	Dec 2016	0.169	Jan 2018	0.000		-		0.000	0.000	1.520	-
6.1 System Engineering	C/CPFF	Northrop Grumman : Bethpage, NY	9.210	4.225	Dec 2016	1.107	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
6.1 System Engineering	WR	NSWC Carderock : Bethesda, MD	1.530	1.000	Nov 2016	0.080	Dec 2017	0.000		-		0.000	0.000	2.610	-
6.1 System Engineering	WR	NSWC PHD : Port Hueneme, CA	1.108	0.350	Jan 2017	0.110	Dec 2017	0.000		-		0.000	0.000	1.568	-
6.1 System Engineering	WR	SPAWAR PAC : San Diego, CA	5.931	1.500	Dec 2016	0.229	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
6.1 System Engineering	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.355	Jan 2018	0.000		-		0.000	0.000	0.355	-
6.4 Integration, Assembly, Test and Checkout	Sub Allot	CECOM Bldg 1207 : Various	0.842	0.250	Feb 2017	0.000		0.000		-		0.000	0.000	1.092	-
6.4 Integration, Assembly, Test and Checkout	WR	NAWC AD : Patuxent River, MD	0.300	0.950	Mar 2017	0.680	Jan 2018	0.000		-		0.000	0.000	1.930	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.203	Oct 2017	0.000		-		0.000	0.000	0.203	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC PC : Panama City, FL	0.000	0.000		0.075	Oct 2017	0.000		-		0.000	0.000	0.075	-
6.4 Integration, Assembly, Test and Checkout	C/CPFF	Northrop Grumman : Bethpage, NY	1.248	0.250	Jan 2017	0.000		0.000		-		0.000	0.000	1.498	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC Carderock : Bethesda, MD	6.977	1.000	Dec 2016	0.648	Jan 2018	0.000		-		0.000	0.000	8.625	-
6.4 Integration, Assembly, Test and Checkout	C/CPFF	PMS 501 : Various	0.000	0.000		1.075	Feb 2018	0.000		-		0.000	0.000	1.075	-
6.4 Integration, Assembly, Test and Checkout	WR	SPAWAR PAC : San Diego, CA	0.580	0.750	Jan 2017	0.527	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules					Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.4 Integration, Assembly, Test and Checkout	WR	NSWC PHD : Port Hueneme, CA	0.978	0.225	Jan 2017	0.109	Nov 2017	0.000		-		0.000	0.000	1.312	-
6.4 Integration, Assembly, Test and Checkout	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.525	Jan 2017	0.425	Jan 2018	0.000		-		0.000	0.000	0.950	-
6.4 Integration, Assembly, Test and Checkout	WR	NAVAIR : Lakehurst	0.000	0.200	Mar 2017	0.000		0.000		-		0.000	0.000	0.200	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	AAC : Uniontown, PA	8.254	4.707	Feb 2017	2.302	Mar 2018	2.500	Jan 2019	-		2.500	0.000	17.763	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NAWC TSD : Orlando, FL	0.750	0.000		0.354	Jan 2018	0.550	Dec 2018	-		0.550	0.000	1.654	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	Northrop Grumman : Bethpage, NY	1.478	0.544	Dec 2016	0.578	Feb 2018	0.990	Jan 2019	-		0.990	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NSWC PC : Panama City, FL	4.322	4.425	Nov 2016	4.123	Dec 2017	2.277	Nov 2018	-		2.277	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NUWC NPT : Newport, RI	1.172	0.402	Dec 2016	0.500	Nov 2017	0.550	Nov 2018	-		0.550	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	1.121	Dec 2016	0.348	Dec 2017	0.820	Dec 2018	-		0.820	0.000	2.289	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	SPAWAR PACIFIC : San Diego, CA	2.105	0.694	Dec 2016	1.150	Jan 2018	0.469	Nov 2018	-		0.469	0.000	4.418	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules					Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NSWC DD : Dahlgren, VA	1.504	0.438	Nov 2016	0.727	Nov 2017	0.743	Nov 2018	-		0.743	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	PMW 760 : Various	0.716	0.173	Jan 2017	0.000		0.000		-		0.000	0.000	0.889	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	Progeny : Manassas, VA	1.000	0.730	Mar 2017	0.000		0.000		-		0.000	0.000	1.730	-
1.0 MCM MP	WR	NSWC PC : Panama City, FL	33.514	23.383	Nov 2016	14.400	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
1.0 MCM MP	Sub Allot	PMS 406 : Various	27.861	11.000	Mar 2017	3.900	Nov 2017	0.000		-		0.000	0.000	42.761	-
1.0 MCM MP	Sub Allot	PMS 495 : Various	0.000	0.000		0.249	Feb 2018	0.000		-		0.000	0.000	0.249	-
1.0 MCM MP	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		2.300	Dec 2017	0.000		-		0.000	0.000	2.300	-
1.0 MCM MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.400	Dec 2017	0.000		-		0.000	0.000	0.400	-
1.0 MCM MP	C/CPFF	Northrop Grumman : Bethpage, NY	0.745	0.544	Dec 2016	0.603	Jan 2018	0.000		-		0.000	0.000	1.892	-
1.0 MCM MP	WR	Various : Various	0.000	1.124	Mar 2017	0.000		0.000		-		0.000	0.000	1.124	-
2.0 ASW MP	Sub Allot	PEO IWS5E : Various	33.620	4.870	Mar 2017	2.604	Dec 2017	0.000		-		0.000	0.000	41.094	-
2.0 ASW MP	WR	NUWC NPT : Newport, RI	16.341	7.422	Dec 2016	13.958	Nov 2017	0.000		-		0.000	0.000	37.721	-
2.0 ASW MP	WR	SSC PAC : San Diego, CA	4.233	0.000		0.734	Dec 2017	0.000		-		0.000	0.000	4.967	-
2.0 ASW MP	WR	CDSA Dam Neck : Virginia Beach, VA	5.112	4.775	Dec 2016	1.258	Nov 2017	0.000		-		0.000	0.000	11.145	-
2.0 ASW MP	C/CPFF	Northrop Grumman : Bethpage, NY	5.147	3.417	Dec 2016	2.350	Feb 2018	0.000		-		0.000	0.000	10.914	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules					Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	WR	PEO IWS 5A : Various	0.601	0.000		8.700	Mar 2018	0.000		-		0.000	0.000	9.301	-
2.0 ASW MP	C/CPFF	SPA : Washington, DC	1.187	0.250	Jan 2017	0.250	Apr 2018	0.000		-		0.000	0.000	1.687	-
2.0 ASW MP	WR	NSWC DD : Dahlgren, VA	0.446	0.000		0.425	Dec 2017	0.000		-		0.000	0.000	0.871	-
2.0 ASW MP	WR	NUWC KPT : Keyport, WA	0.595	0.000		0.500	Feb 2018	0.000		-		0.000	0.000	1.095	-
2.0 ASW MP	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		1.550	Nov 2017	0.000		-		0.000	0.000	1.550	-
2.0 ASW MP	C/FPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.500	Dec 2017	0.000		-		0.000	0.000	0.500	-
2.0 ASW MP	WR	NAWC WD : Point Mugu, CA	2.030	3.000	Feb 2017	0.400	Mar 2018	0.000		-		0.000	0.000	5.430	-
2.0 ASW MP	C/CPFF	Various : Various	0.000	3.307	Feb 2017	0.450	Nov 2017	0.000		-		0.000	0.000	3.757	-
2.0 ASW MP	Sub Allot	Raytheon : Portsmouth, RI	31.368	2.500	Mar 2017	16.188	Jan 2018	0.000		-		0.000	0.000	50.056	-
3.0 SUW MP	C/CPFF	JAMS PO : Various	0.000	6.480	Feb 2017	1.500	Mar 2018	0.000		-		0.000	0.000	7.980	-
3.0 SUW MP	WR	NAWC WD : Ridgecrest, CA	7.826	0.000		0.000		0.000		-		0.000	0.000	7.826	-
3.0 SUW MP	C/CPFF	Northrop Grumman : Bethpage, NY	42.564	15.960	Dec 2016	2.000	Feb 2018	0.000		-		0.000	0.000	60.524	-
3.0 SUW MP	WR	NSWC CD : Crane, IN	0.396	0.000		0.000		0.000		-		0.000	0.000	0.396	-
3.0 SUW MP	WR	NSWC Corona : Corona, CA	0.495	0.250	Jan 2017	0.950	Jan 2018	0.000		-		0.000	0.000	1.695	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	38.019	14.900	Nov 2016	7.397	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
3.0 SUW MP	WR	NSWC PHD : Port Hueneme, CA	22.637	2.000	Jan 2017	5.800	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
3.0 SUW MP	Sub Allot	PEO IWS 3 : Various	7.319	2.500	Feb 2017	0.000		0.000		-		0.000	0.000	9.819	-
Subtotal		332.792	133.792			106.268		8.899				8.899	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules					Project (Number/Name) 3129 / LCS Mission Package Development					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.5 Training Systems Development	WR	NAWC TSD : Orlando, FL	0.000	0.555	Jan 2017	0.354	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
6.5 Training Systems Development	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.390	Oct 2017	0.000		-		0.000	0.000	0.390	-
6.5 Training Systems Development	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.268	Dec 2017	0.000		-		0.000	0.000	0.268	-
6.5 Training Systems Development	C/CPAF	Northrop Grumman : Bethpage, NY	0.000	0.000		0.575	Jan 2018	0.000		-		0.000	0.000	0.575	-
6.5 Training Systems Development	Sub Allot	Various : Various	1.520	1.701	Mar 2017	0.000		0.000		-		0.000	0.000	3.221	-
6.5 Training Systems Development	WR	JHU/APL : Laurel, MD	1.479	0.000	Feb 2017	0.000		0.000		-		0.000	0.000	1.479	-
Subtotal			2.999	2.256		1.587		0.000		-		0.000	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.3 System Test and Evaluation	WR	NSWC PHD : Port Hueneme, CA	18.428	7.820	Jan 2017	1.715	Nov 2017	0.000		-		0.000	0.000	27.963	-
6.3 System Test and Evaluation	WR	COMOPTEVFOR : Norfolk, VA	2.994	1.300	Mar 2017	0.650	Jan 2018	0.000		-		0.000	0.000	4.944	-
6.3 System Test and Evaluation	WR	NSWC Corona : Corona, Ca	0.000	0.000		0.500	Nov 2017	0.000		-		0.000	0.000	0.500	-
6.3 System Test and Evaluation	WR	SPAWAR PAC : San Diego, CA	3.258	2.000	Dec 2016	0.000		0.000		-		0.000	0.000	5.258	-
6.3 System Test and Evaluation	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.750	Jan 2018	0.000		-		0.000	0.000	0.750	-
Subtotal			24.680	11.120		3.615		0.000		-		0.000	0.000	39.415	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.2 Program Management	C/CPFF	CACI : Fairfax, VA	7.698	0.000		0.000		0.000		-		0.000	0.000	7.698	-
6.2 Program Management	C/CPIF	Booz Allen Hamilton : Washington DC	0.000	1.937	Nov 2016	2.758	Dec 2017	0.000		-		0.000	0.000	4.695	-
6.2 Program Management	FFRDC	Mitre : McLean, VA	1.379	1.300	Jan 2017	0.000		0.000		-		0.000	0.000	2.679	-
6.2 Program Management	FFRDC	JHU/APL : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
6.2 Program Management	C/CPFF	Northrop Grumman : Bethpage, NY	2.071	1.440	Dec 2016	1.466	Feb 2018	0.000		-		0.000	0.000	4.977	-
6.2 Program Management	C/CPFF	NSWC Crane : Various	0.000	1.750	Dec 2016	1.177	Nov 2017	0.000		-		0.000	0.000	2.927	-
Subtotal			11.148	6.427		5.401		0.000		-		0.000	0.000	22.976	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			371.619	153.595		116.871		8.899		-		8.899	Continuing	Continuing	N/A

Remarks

Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:

2550 Mine Countermeasures (MCM) Mission Package
 2551 Anti-Submarine Warfare (ASW) Mission Package
 2552 Surface Warfare (SUW) Mission Package
 3129 LCS Mission Package Development

Prior to FY 2019 all Mission Package funding was in project 3129.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603596N / (U)LCS Mission Modules

Project (Number/Name)

3129 / LCS Mission Package Development

Proj 3129	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
LCS MCM Mission Package Development	MCM Development and Testing - Refer to Project 2550																												
LCS ASW Mission Package Development	ASW Development and Testing - Refer to Project 2551																												
LCS SUW Mission Package Development	SUW Development and Testing - Refer to Project 2552																												
LCS C5I and Tactical Training																													
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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development		
Schedule Details				
Events by Sub Project		Start	End	
Proj 3129		Quarter	Year	Quarter
LCS MCM Mission Package Development: LCS MCM Mission Package Development		1	2017	4
LCS ASW Mission Package Development: LCS ASW Mission Package Development		1	2017	4
LCS SUW Mission Package Development: LCS SUW Mission Package Development		1	2017	4
LCS C5I and Tactical Training: MVCS Baseline Delivery to support MCM MP Testing		4	2019	4
LCS C5I and Tactical Training: Common Mission Package Trainer update to support MCM Development		1	2019	4
LCS C5I and Tactical Training: Commn Mission Package Trainer update to incorporate ASW MP capabilities		1	2019	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603597N I (U)Automated Test and Analysis										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	22.839	14.507	8.052	7.931	-	7.931	7.926	8.083	8.248	8.416	Continuing	Continuing			
9B88: Automated Test and Analysis	22.839	14.507	8.052	7.931	-	7.931	7.926	8.083	8.248	8.416	Continuing	Continuing			
A. Mission Description and Budget Item Justification															
The FY 2019 funding request was reduced by \$.012 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.															
In FY 2016, OPNAV N94 took on the challenge to implement a Naval enterprise approach to Automated Test and Analysis (ATA). ATA expands the automated test methods currently in use such as Automated Test and Re-Test (ATRT), adds new methods of testing and use of automated test technologies, and standardizes automated test practices, methods and tools. Examples from FY16 include but are not limited to improvements to Link-16 Non-C2 data collection, essential Mission Planning, Service Oriented Architecture Framework, AEGIS Enterprise Solution Enhancements, Strike Force Interoperability testing and Control System Restoration and Validation. In addition, funding supports the development of enterprise level strategies to apply ATA technology to the software-intensive acquisition programs. The FY 2015 ATRT project was funded on Program Element 0603597N under Project Unit 9B88: "Automated Test and Re-Test". Starting in FY16 and through the out-years, the project is renamed "Automated Test and Analysis" on Program Element 0603597N under Project Unit 9B88.															
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
Previous President's Budget				0.000	8.052	8.037	-	8.037							
Current President's Budget				14.507	8.052	7.931	-	7.931							
Total Adjustments				14.507	0.000	-0.106	-	-0.106							
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional Add Adjustments 				-	-	-	-	-							
				-0.493	0.000	-	-	-							
				0.000	0.000	-0.012	-	-0.012							
				0.000	0.000	-0.094	-	-0.094							
				15.000	-	-	-	-							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis				Project (Number/Name) 9B88 / Automated Test and Analysis				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9B88: Automated Test and Analysis	22.839	14.507	8.052	7.931	-	7.931	7.926	8.083	8.248	8.416	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

In FY 2016, OPNAV N94 took on the challenge to implement a Naval enterprise approach to Automated Test and Analysis (ATA). ATA expands the automated test methods currently in use such as Automated Test and Re-Test (ATRT), adds new methods of testing and use of automated test technologies, and standardizes automated test practices, methods and tools. Examples from FY16 include but are not limited to improvements to Link-16 Non-C2 data collection, essential Mission Planning, Service Oriented Architecture Framework, AEGIS Enterprise Solution Enhancements, Strike Force Interoperability testing and Control System Restoration and Validation. In addition, funding supports the development of enterprise level strategies to apply ATA technology to the software-intensive acquisition programs. The FY 2015 ATRT project was funded on Program Element 0603597N under Project Unit 9B88: "Automated Test and Re-Test". Starting in FY16 and through the out-years, the project is renamed "Automated Test and Analysis" on Program Element 0603597N under Project Unit 9B88.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Automated Test and Analysis FY 2018 Plans: As of June 2017 twenty three proposals were selected based on their ability to best describe technical merit for nine criteria to include productivity, reusability, enhanced coverage, improved fidelity and reduction in Total Ownership Cost by the Executive Steering Group, which includes Senior Executive level representatives from Naval Sea, Naval Air, Space and Naval Warfare, and US Marine Corps Systems Commands. With a budget of \$8M, ATA will be able to provide support to five projects: o Automated System-of-Systems Operability Testing o Dev. and Integration of the Enterprise Air Surveillance Radar (EASR) o Test Automation Framework for the Distributed Common Ground System-Navy (DCGS-N) o Continuous Automated Services Testing for Joint Mission Planning System o Joint Tactical Common Operational Picture (COP) Workstation	14.507	8.052	7.931	0.000	7.931

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis	Project (Number/Name) 9B88 / Automated Test and Analysis				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The ATA Enterprise Program Office will continue with another Naval enterprise-wide data call soliciting automated test tool proposals that will spring-board from some of these efforts and can significantly reduce the time to complete critical testing, increase productivity or system robustness, improve and speed test analysis, and identify commonalities for reuse in Navy acquisition programs for further study in FY 2019. These automated testing projects will reduce errors, increase capabilities and enhance reporting timelines while decreasing Total Ownership Costs for testing critical Navy program initiatives.	FY 2019 Base Plans: Continue to improve on the automated testing and analysis investments to date. Reevaluate selected ATA FY 2018 proposals for improving technologies in FY 2019 and potential collaboration in development. FY 2019 plans will also build upon the results and lessons learned from the FY 2017 and FY 2018 selection process for improved ATA program planning, selection, execution and analysis with the ATA ESG. The Navy intends to continue improvements in the quality of end products, reducing the time to plan, evaluate, analyze and/or report testing requirements, identify cost avoidance and determine the reduction in total ownership costs for each ATA project. The Navy will also determine enterprise solutions that significantly reduce test and evaluation man-hours, positively impact fleet training, and improve test plans and procedures. The Navy will continue: <ul style="list-style-type: none">o Assessing undersea warfare capabilities or fleet modernization and future Navy testing competencieso Evaluating best practices and research capabilities for platform network resiliency and system function validationo Determining common elements through ATA analysis and reporting across multiple SYSCOMs and identifying synergies in development, implementation and trainingo Augmenting both surface and air Mission Planning for requirements traceability. Specific topics include but are not limited to: <ul style="list-style-type: none">o Automating Test Framework for Operations Centers or Service Oriented Architectureso Continuing advanced Combat System development/enhancements (SSDS and AEGIS)o Testing of shipboard navigation or mechanical systems and tactical data links analysis (Link-16)o Integrating test and analyses among various Strike Force Interoperability platformso Implementing test planning/manager improvements					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis		Project (Number/Name) 9B88 / Automated Test and Analysis		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The Navy will conduct another Naval enterprise-wide data call soliciting automated test tool proposals that can significantly reduce the time to complete critical testing, improve and speed test analysis, and identify and correct critical design flaws in testing of Naval acquisition programs for further study in FY 2020.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Reduction due to Process Improvement to Increase Efficiency in Military Spending and Economic Assumptions/ Purchase Inflation Rate Change for PB.						
Accomplishments/Planned Programs Subtotals		14.507	8.052	7.931	0.000	7.931
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy The ATA program solicits automated test tool proposals from all qualified sources that show the potential to significantly reduce the time to complete critical testing, increase productivity or system robustness, improve and speed test analysis, and identify commonalities for reuse in testing of Naval acquisition programs. All valid submitted proposals will be evaluated by an Executive Steering Group (ESG) composed of Senior Executive level representatives from NAVSEA, NAVAIR, SPAWAR and US Marine Corps Systems Commands. Proposals selected by the ESG will be funded for one year, in which time they must demonstrate their ability to significantly reduce the time to complete critical testing, improve and speed test analysis, or find and correct critical design flaws in testing of Naval acquisition programs. Successful funded proposals and artifacts will be advertised and made available across the Naval enterprise for acquisition program consideration, funding, and use.						
E. Performance Metrics FY 2017 Program Management was directed to assess ATA projects for: - Technical improvements/quality of the end-product, - Use of automation to optimize resource allocation to: o Increase productivity/robustness o Plan a test o Execute a test o Analyze a test o Report a test, - Cost avoidance for the program/project,						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis	Project (Number/Name) 9B88 / Automated Test and Analysis
- Length of time to see the return on investment. Progress towards meeting these objectives of ATA efforts is being monitored via the following: - Monthly Project Manager technical reports, expenditures and risk assessments o Quarterly Program Reviews - Bi-Annual ATA Executive Steering Group Meetings		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis						Project (Number/Name) 9B88 / Automated Test and Analysis						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Automated Test & Analysis	C/CPFF	Innovative Defense Technologies (IDT) : Ballston, VA	16.052	11.051	Aug 2017	4.751	Dec 2017	4.770	Dec 2018	-		4.770	0.000	36.624	-	
Automated Test & Analysis	WR	SPAWAR Pacific : San Diego, CA	2.611	1.710	Jul 2017	2.076	Nov 2017	2.019	Oct 2018	-		2.019	0.000	8.416	-	
Automated Test & Analysis	WR	Marine Corp : Not Specified	0.833	0.000		0.000		0.000	Nov 2018	-		0.000	0.000	0.833	-	
Automated Test & Analysis	C/CPFF	NAVAIR : Lakehurst NJ	1.569	0.266	Jul 2017	0.465	Dec 2017	0.463	Nov 2018	-		0.463	0.000	2.763	-	
Automated Test & Analysis	WR	Various NSWCs : NSWC DD	0.410	0.340	Aug 2017	0.100	Feb 2018	0.000		-		0.000	0.000	0.850	-	
Automated Test & Analysis	C/CPFF	AFIT : Wright-Patterson AFB, OH	0.000	0.500	Aug 2017	0.000		0.000		-		0.000	0.000	0.500	-	
Subtotal			21.475	13.867		7.392		7.252		-		7.252	0.000	49.986	N/A	
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Automated Test & Analysis	C/CPFF	Gryphon Technologies : Washington, DC	0.929	0.414	Sep 2017	0.427	Jan 2018	0.439	Jan 2019	-		0.439	Continuing	Continuing	Continuing	
Automated Test & Analysis	C/CPFF	Alion Sciences : McLean, VA	0.435	0.226	Sep 2017	0.233	Jan 2018	0.240	Jan 2019	-		0.240	0.000	1.134	-	
Subtotal			1.364	0.640		0.660		0.679		-		0.679	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				22.839	14.507		8.052		7.931		-		7.931	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603597N / (U)Automated Test and Analysis

Project (Number/Name)

9B88 / Automated Test and Analysis

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Proj 9B88

Automated Test and Analysis (ATA): FY17 Project 1: E2E automated testing for Aircraft Launch and Recovery Equipment (ALRE)	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 2: AMDR Control Software Integration and Regression Testing Efficiency	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 3: Platform Level Persistent Configuration Management (PCM)	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 4: AMDR ACB20 Combat System Integration and Regression Testing Efficiency	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 5: Testing of NEWCIM Link 16 Messages	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 6: Behavior Driven Development and Testing CI for J MPS	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 7: CANES Configuration Update Verification Automation	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 8: E2E automated testing program for MQ-8C FireScout	[REDACTED]
Automated Test and Analysis (ATA): FY17 Project 9: CANES_ADNS Production Automation	[REDACTED]

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)						
1319 / 4					PE 0603597N / (U)Automated Test and Analysis					9B88 / Automated Test and Analysis						
					FY 2017					FY 2018					FY 2023	
					1	2	3	4	1	2	3	4	1	2	3	4
Automated Test and Analysis (ATA): FY17 Project 11: Overnight Build Test and Analysis					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 12: AN/BYG-1 Human Augmented T&E					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 13: Automation of DISA STIG Validation Testing					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 14: CVN78 MCMS Configuration Verification					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 15: Automated Baseline/Platform Configuration Verification					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 16: Unified DevOps Orchestration Engine (SUDOE)					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 17: Scientific Test and Analysis Techniques for Automatic Test and Analysis					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 18: Display Input Emulator and Video Grabber					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY17 Project 19: Common Control System (CCS) Test Program					[REDACTED]					[REDACTED]					[REDACTED]	
Automated Test and Analysis (ATA): FY18 Project 1: Automated System-of-Systems Operability Testing					[REDACTED]					[REDACTED]					[REDACTED]	

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018													
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								Project (Number/Name)															
1319 / 4					PE 0603597N / (U)Automated Test and Analysis								9B88 / Automated Test and Analysis															
					FY 2017	FY 2018			FY 2019	FY 2020			FY 2021	FY 2022			FY 2023											
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Automated Test and Analysis (ATA): FY18 Project 2: Dev. and Integration of the Enterprise Air Surveillance Radar (EASR)					[REDACTED]																							
Automated Test and Analysis (ATA): FY18 Project 3: Test Automation Framework for the Distributed Common Ground System-Navy (DCGS-N)					[REDACTED]																							
Automated Test and Analysis (ATA): FY18 Project 4: Continuous Automated Services Testing for Joint Mission Planning System					[REDACTED]																							
Automated Test and Analysis (ATA): FY18 Project 5: Joint Tactical Common Operational Picture (COP) Workstation					[REDACTED]																							
Automated Test and Analysis (ATA): Annual Startup Projects for ATA Implementation					[REDACTED]																							
Automated Test and Analysis (ATA): FY19: Assessing undersea warfare capabilities or fleet modernization and future Navy testing competencies					[REDACTED]																							
Automated Test and Analysis (ATA): FY19: Evaluating best practices and research capabilities for platform network resiliency and system function validation					[REDACTED]																							
Automated Test and Analysis (ATA): FY19: Assess common architecture analysis and reporting across SYSCOMS and identify synergies in development, implementation and training					[REDACTED]																							

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018											
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4								PE 0603597N / (U)Automated Test and Analysis								9B88 / Automated Test and Analysis											
				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Automated Test and Analysis (ATA): FY19: Augment both surface and air Mission Planning for requirements traceability								[REDACTED]																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis	Project (Number/Name) 9B88 / Automated Test and Analysis

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 9B88				
Automated Test and Analysis (ATA): FY17 Project 1: E2E automated testing for Aircraft Launch and Recovery Equipment (ALRE)	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 2: AMDR Control Software Integration and Regression Testing Efficiency	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 3: Platform Level Persistent Configuration Management (PCM)	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 4: AMDR ACB20 Combat System Integration and Regression Testing Efficiency	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 5: Testing of NEWCIM Link 16 Messages	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 6: Behavior Driven Development and Testing CI for J MPS	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 7: CANES Configuration Update Verification Automation	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 8: E2E automated testing program for MQ-8C FireScout	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 9: CANES_ADNS Production Automation	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 11: Overnight Build Test and Analysis	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 12: AN/BYG-1 Human Augmented T&E	4	2017	4	2018
Automated Test and Analysis (ATA): FY17 Project 13: Automation of DISA STIG Validation Testing	4	2017	4	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis	Project (Number/Name) 9B88 / Automated Test and Analysis			
Events by Sub Project	Start		End		
	Quarter	Year	Quarter	Year	
	Automated Test and Analysis (ATA): FY17 Project 14:CVN78 MCMS Configuration Verification	4	2017	4	2018
	Automated Test and Analysis (ATA): FY17 Project 15: Automated Baseline/Platform Configuration Verification	4	2017	4	2018
	Automated Test and Analysis (ATA): FY17 Project 16: Unified DevOps Orchestration Engine (SUDOE)	4	2017	4	2018
	Automated Test and Analysis (ATA): FY17 Project 17: Scientific Test and Analysis Techniques for Automatic Test and Analysis	4	2017	4	2018
	Automated Test and Analysis (ATA): FY17 Project 18 :Display Input Emulator and Video Grabber	4	2017	4	2018
	Automated Test and Analysis (ATA): FY17 Project 19: Common Control System (CCS) Test Program	4	2017	4	2018
	Automated Test and Analysis (ATA): FY18 Project 1:Automated System-of-Systems Operability Testing	1	2018	1	2019
	Automated Test and Analysis (ATA): FY18 Project 2:Dev. and Integration of the Enterprise Air Surveillance Radar (EASR)	1	2018	1	2019
	Automated Test and Analysis (ATA): FY18 Project 3: Test Automation Framework for the Distributed Common Ground System-Navy (DCGS-N)	1	2018	1	2019
	Automated Test and Analysis (ATA): FY18 Project 4: Continuous Automated Services Testing for Joint Mission Planning System	2	2018	2	2019
	Automated Test and Analysis (ATA): FY18 Project 5:Joint Tactical Common Operational Picture (COP) Workstation	1	2018	1	2019
	Automated Test and Analysis (ATA): Annual Startup Projects for ATA Implementation	1	2017	4	2021
	Automated Test and Analysis (ATA): FY19: Assessing undersea warfare capabilities or fleet modernization and future Navy testing competencies	1	2019	4	2019
	Automated Test and Analysis (ATA): FY19: Evaluating best practices and research capabilities for platform network resiliency and system function validation	1	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603597N / (U)Automated Test and Analysis	Project (Number/Name) 9B88 / Automated Test and Analysis		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Automated Test and Analysis (ATA): FY19: Assess common architecture analysis and reporting across SYSCOMS and identify synergies in development, implementation and training	1	2019	4	2019
Automated Test and Analysis (ATA): FY19: Augment both surface and air Mission Planning for requirements traceability	1	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603599N I (U)Frigate Development								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	18.910	83.080	143.450	134.772	-	134.772	75.353	77.639	70.469	72.022	Continuing	Continuing	
3086: Frigate	18.910	83.080	143.450	134.772	-	134.772	75.353	77.639	70.469	72.022	Continuing	Continuing	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): 374													
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$4.608 million to account for the availability of prior year execution balances.													
In FY14, the Navy established the requirements for a lethal and survivable small surface combatant ship (later redesignated as Frigate (FF)), above that of Littoral Combat Ship (LCS) to meet future missions. Based upon the Navy's 2016 Force Structure Assessment resulting in validation of the need for 52 small surface combatants and the need to address increasingly complex threats in the global maritime environment, the Navy reassessed the capabilities required to ensure the Frigate paces future threats. With FFG(X), the Navy desires to maximize the small surface combatant capabilities in the anti-surface warfare (SUW), anti-submarine warfare (ASW), electromagnetic maneuver warfare (EMW), and air warfare (AW) mission areas, while keeping the ship affordable and as a part of a "high-low" mix of surface ships. The updated assessment was completed to support establishment of top-level FFG(X) requirements in Summer 2017 and resulted in a Navy-approved Capability Development Document (CDD).													
The FFG(X) program will continue to refine the cost estimates to support a FY20 Detail Design and Construction (DD&C) contract award. Based on the updated FFG(X) requirements, FY17 focused on efforts for the system specification (SPEC) development and on conceptual design contract development. FY18 funding continues to refine the system SPEC and to award conceptual design contracts to multiple vendors. Additionally, funds will be used to continue maturing the FFG(X) Government Furnished Equipment (GFE) baseline, continue Combat Management System (CMS) design development, coding, and test, acquisition documentation development, C4I systems development and continuing system engineering efforts to ensure mature Government Furnished Information (GFI) deliveries. Efforts in FY19 reflect the continuation of conceptual design tasking, which will support the FY19 DD&C Request for Proposal (RFP) release and to continue development and maturation of CMS, Government Furnished Equipment (GFE), C4I, and system engineering efforts. FY20 funding has been realigned to SCN 2127 to support systems engineering, cost estimating, and ship design management. The shift to SCN marks the completion of the conceptual design phase.													
FY19 RDT&E funding is critical to an effective and timely completion of contract design and specification development, which is needed to better inform and develop the Detailed Design and Construction RFP. Conceptual Design before the competitive Detail Design and Construction award allows the maturation of multiple designs to give the Navy a better understanding of cost and capability drivers across the various design options. This due diligence will provide the opportunity for the government to identify and implement cost reduction opportunities and inform the final specifications that will deliver the required capability at an affordable price and achieve the best value solution.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		PE 0603599N / (U)Frigate Development			
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Previous President's Budget		84.900	143.450	141.599	-
Current President's Budget		83.080	143.450	134.772	-
Total Adjustments		-1.820	0.000	-6.827	-
• Congressional General Reductions		-	-		
• Congressional Directed Reductions		-	-		
• Congressional Rescissions		-	-		
• Congressional Adds		-	-		
• Congressional Directed Transfers		-	-		
• Reprogrammings		-	-		
• SBIR/STTR Transfer		-1.820	0.000		
• Program Adjustments		0.000	0.000	-5.108	-
• Rate/Misc Adjustments		0.000	0.000	-1.719	-
Change Summary Explanation					
The FY 2019 funding request was reduced by \$4.608 million to account for the availability of prior year execution balances.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development				Project (Number/Name) 3086 I Frigate				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3086: Frigate	18.910	83.080	143.450	134.772	-	134.772	75.353	77.639	70.469	72.022	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			
Project MDAP/MAIS Code: 374													

A. Mission Description and Budget Item Justification

Frigate (FFG(X)) efforts are composed of the design and development for a more lethal and survivable multi-mission warship focused on anti-surface warfare and anti-submarine warfare capabilities (SUW/ASW), local air defense and enhanced survivability features. FFG(X) design modifications for added capability over LCS include an over-the-horizon (OTH) surface-to-surface missile system, upgraded air defense weapons and sensors, advanced electronic warfare system and improved decoys, local air defense, and enhanced survivability features. This effort will encompass design, development, and technical issue resolution to support design maturity for FFG(X) FY20 contract award. Certification and testing efforts are also required to support the FFG(X) delivery, operations, and introduction to the fleet.

The FFG(X) design and development phases include platform design, development and risk reduction; combat system element integration; total ship system engineering and integration; combat systems and warfare systems certification; and planning and conduct of system testing. These efforts include procurement of combat and warfare system elements and/or simulators to support production representative testing in support of design, development, and certification efforts and ordnance in support of testing. Primary design modifications over the LCS will include an over-the-horizon (OTH) surface-to-surface missile system, upgraded air defense weapons and sensors, advanced electronic warfare system and improved decoys, local air defense, and enhanced survivability features.

This funding will also include efforts and activities required for formal Developmental and Operational testing of the FFG(X). Test and Evaluation (T&E) will concentrate on verifying integration and interoperability of employed technologies and systems in the FFG(X) design to achieve the mission capabilities and performance requirements as defined in the FFG(X) Capabilities Development Document (CDD). T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP).

The FY 2019 funding request was reduced by \$4.608 million to account for the availability of prior year execution balances.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Ship Systems / C4I / Warfare Systems Engineering	80.567	142.343	131.567	0.000	131.567
Articles: Description: The Frigate (FFG(X)) is a multi-mission ship that focuses on anti-surface warfare, anti-submarine warfare capabilities and local air defense. Specific capabilities include over-the-horizon (OTH) surface-to-surface missile system, upgraded Air Defense weapons and sensors, advanced electronic warfare system and improved decoys, horizon surface-to-surface missile system, variable depth sonar, towed array, torpedo defense, and enhanced survivability features.	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development	Project (Number/Name) 3086 I Frigate				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Funding was realigned from Test & Evaluation to Ship Systems Engineering due to program restructure which delayed testing efforts one year. Additional ship systems engineering effort is in the added conceptual design efforts are captured in the FFG(X) conceptual design phase.						
Ship Systems Engineering Continue system engineering efforts related to naval architecture, machinery engineering and topside design analysis. Emphasis will be placed on the structural and stability disciplines, and incorporation of lethality and survivability enhancements to include the flow-down impacts to the supporting machinery and electrical systems in support of system Spec and evaluation of contractor designs. Continue development and refinement of the System SPEC. Begin contractor-led conceptual designs to support FY20 DD&C competition. Begin development of the Milestone B documentation. Continue efforts to support and verify cost estimates and the Independent Cost Estimate (ICE)/ Component Cost Position (CCP).						
C4I / Warfare Systems Engineering Continue system engineering efforts related to C4I and warfare systems specifications. Continue OTH systems engineering and testing efforts for integration of OTH missile. Continue CMS development efforts to ensure full ship integration aligns with platform design efforts and to integrate additional FFG(X) required capabilities. Execute CS Software efforts to support a delta System Requirements Review (SRR), which incorporates additional FFG(X) capabilities. Integrate other CS and C4I elements into total ship design. Implement additional cyber security/information assurance (IA) measures on the warfare system and C4I suite to pace the current and future threats. Begin development of the Milestone B documentation. Continue efforts to support and verify cost estimates and the Independent Cost Estimate (ICE)/ Component Cost Position (CCP).						
FY 2019 Base Plans: Ship Systems Engineering Continue system engineering efforts related to naval architecture, machinery engineering and topside design analysis. Emphasis will be placed on the structural and stability disciplines, and incorporation of lethality and survivability enhancements to include the flow-down impacts to the supporting machinery and electrical systems. Completion of the Final System SPEC to support DD&C release. Completion of contractor-led conceptual designs to support FY 2020 competition. Continue development of the documentation to support Milestone B in FY20. Continue efforts to support and verify updated cost estimates and the Independent Cost Estimate (ICE)/ Component Cost Position (CCP). Release of DD&C RFP.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development	Project (Number/Name) 3086 / Frigate					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
C4I / Warfare Systems Engineering Continue system engineering efforts related to C4I and warfare systems specifications. Continue OTH systems engineering and testing efforts for integration of OTH missile. Continue CMS development efforts to ensure full ship integration aligns with total ship design efforts and integrate additional FFG(X) required capabilities. Execute CS Software delta System Functional Review (SFR). Integrate other CS and C4I elements into total ship design. Implement additional cyber security/information assurance (IA) measures on the warfare system and C4I suite to pace the current and future threats. Continue development of the Milestone B documentation. Continue efforts to support and verify cost estimates and the Independent Cost Estimate (ICE)/ Component Cost Position (CCP).							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Decreases in funding from FY 2018 to FY 2019 reflect the conclusion of system specification and the reduction of \$4.608 million to account for the availability of prior year execution balances.							
Title: Test & Evaluation Articles:	2.513	1.107	3.205	0.000	3.205		
Description: Conduct FFG(X) test planning in support of Developmental Testing and Operational Testing (DT/OT), including Live Fire Test and Evaluation (LFT&E), and procurement of T&E Ordnance. Plan for and execute DT and C4I integration & test, cyber test and certification, warfare system integration & test and certification, aviation (manned and unmanned) integration & test and certification. Late FY17 efforts were shifted to the FFG(X) test planning leveraging the FF test planning efforts.	-	-	-	-	-		
FY 2018 Plans: Leverage FF Test and Evaluation Master Plan (TEMP) updates to build the FFG(X) TEMP. Begin testing integrated product teams (IPTs) across DoD stakeholder organizations (WIPTs) to coordinate content and refinements with stakeholder organizations. Develop LFT&E Management Plan in conjunction with DOT&E and apply for LFT&E waiver. Compile final testing analysis of FF structures and hull model test and assess potential uses for modeling and simulation in support of FFG(X). Continue to develop plan to support future updates required for land-based SIM/STIM modeling and test requirements for the integration and test of the FFG(X) platform. Continue development of test sequence network and combat system test efforts to support contracting efforts.							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018																											
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603599N / (U)Frigate Development				Project (Number/Name) 3086 / Frigate																											
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total																							
Funding in FY18 was realigned from Test & Evaluation to Ship Systems Engineering due to program restructure which delayed testing efforts one year.																																		
FY 2019 Base Plans: Continue FFG(X) Test and Evaluation Master Plan (TEMP) updates and continue WIPTs required to achieve TEMP approval. Support future updates required for land-based SIM/STIM test requirements for the integration and test of the FFG(X) platform. Begin execution of land-based SIM/STIM modeling and test efforts. Acquire LFT&E Waiver Approval to support MS B.																																		
FY 2019 OCO Plans: N/A																																		
FY 2018 to FY 2019 Increase/Decrease Statement: Increases in funding from FY 2018 to FY 2019 reflect the beginning of SIM/STIM modeling and testing efforts that were delayed due to the program restructure in FY 2017.																																		
Accomplishments/Planned Programs Subtotals							83.080	143.450	134.772	0.000	134.772																							
C. Other Program Funding Summary (\$ in Millions) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Line Item</th> <th style="text-align: right;">FY 2017</th> <th style="text-align: right;">FY 2018</th> <th style="text-align: right;">FY 2019 Base</th> <th style="text-align: right;">FY 2019 OCO</th> <th style="text-align: right;">FY 2019 Total</th> <th style="text-align: right;">FY 2020</th> <th style="text-align: right;">FY 2021</th> <th style="text-align: right;">FY 2022</th> <th style="text-align: right;">FY 2023</th> <th style="text-align: right;">Cost To Complete</th> <th style="text-align: right;">Total Cost</th> </tr> </thead> <tbody> <tr> <td>• SCN/2127: Littoral Combat Ship (LCS)</td> <td style="text-align: right;">1,649.692</td> <td style="text-align: right;">1,162.936</td> <td style="text-align: right;">749.428</td> <td style="text-align: right;">-</td> <td style="text-align: right;">749.428</td> <td style="text-align: right;">1,228.176</td> <td style="text-align: right;">849.087</td> <td style="text-align: right;">1,791.867</td> <td style="text-align: right;">1,791.996</td> <td style="text-align: right;">3,768.664</td> <td style="text-align: right;">24,792.911</td> </tr> </tbody> </table>											Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	• SCN/2127: Littoral Combat Ship (LCS)	1,649.692	1,162.936	749.428	-	749.428	1,228.176	849.087	1,791.867	1,791.996	3,768.664	24,792.911
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost																							
• SCN/2127: Littoral Combat Ship (LCS)	1,649.692	1,162.936	749.428	-	749.428	1,228.176	849.087	1,791.867	1,791.996	3,768.664	24,792.911																							
Remarks In FY 2017 - 2019, the SCN represents LCS procurement. Beginning in FY 2020, the SCN represents FFG(X) procurement.																																		
D. Acquisition Strategy The FFG(X) acquisition strategy is currently being developed to pursue a full and open competitive contract award in FY20.																																		
E. Performance Metrics T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP).																																		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development					Project (Number/Name) 3086 I Frigate					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Conceptual Design Contracts	TBD	Various : Various	0.000	2.500	Sep 2017	50.000	Feb 2018	42.500	Feb 2019	-		42.500	0.000	95.000	-
System SPEC Development	WR	Government Activites : Various	0.000	5.580	Mar 2017	1.500	Jan 2018	0.375	Jan 2019	-		0.375	Continuing	Continuing	Continuing
System SPEC Development	C/CPAF	Various Contractors : Various	0.000	2.500	Mar 2017	2.500	Jan 2018	0.875	Jan 2019	-		0.875	Continuing	Continuing	Continuing
Ship Design Modifications	C/CPAF	Lockheed Martin : Various	2.755	9.015	Dec 2016	0.000		0.000		-		0.000	0.000	11.770	-
Ship Design Modifications	C/CPAF	Austal : Mobile, AL	2.726	5.925	Dec 2016	0.000		0.000		-		0.000	0.000	8.651	-
Over the Horizon (OTH) Missile Integration	WR	NAWC, China Lake : China Lake, CA	0.067	0.585	Feb 2017	0.500	Feb 2018	0.510	Feb 2019	-		0.510	Continuing	Continuing	Continuing
Over the Horizon (OTH) Missile Integration	WR	Various : Various	0.202	1.211	Feb 2017	1.200	Feb 2018	1.274	Feb 2019	-		1.274	Continuing	Continuing	Continuing
C4I Development	WR	PEO C4I : San Diego, CA	0.250	0.162	Nov 2016	0.578	Nov 2017	0.733	Nov 2018	-		0.733	Continuing	Continuing	Continuing
C4I Development	WR	SPAWAR : San Diego, CA	0.828	2.688	Nov 2016	2.941	Nov 2017	3.094	Nov 2018	-		3.094	Continuing	Continuing	Continuing
C4I Development	WR	SPAWAR : Charleston, SC	0.919	0.988	Nov 2016	1.950	Nov 2017	1.784	Nov 2018	-		1.784	Continuing	Continuing	Continuing
Common Combat Management System Development (CMS)	C/CPIF	Lockheed Martin : Various	1.052	14.700	Jan 2017	25.980	Jan 2018	28.057	Jan 2019	-		28.057	Continuing	Continuing	Continuing
Common Combat Management System Development (CMS)	C/CPAF	Austal : Mobile, AL	0.250	0.250	Jan 2017	0.000		0.000		-		0.000	0.000	0.500	-
Common Combat Management System Development (CMS)	WR	Government Activites : Various	0.117	2.006	Nov 2016	4.148	Nov 2017	3.727	Nov 2018	-		3.727	Continuing	Continuing	Continuing
Warfare Systems Development	WR	NUWC, Newport : Newport, RI	0.150	1.350	Nov 2016	3.080	Nov 2017	3.129	Nov 2018	-		3.129	Continuing	Continuing	Continuing
Warfare Systems Development	WR	NSWC, DD : Dahlgren, VA	1.040	3.949	Nov 2016	5.571	Nov 2017	5.952	Nov 2018	-		5.952	Continuing	Continuing	Continuing
Warfare Systems Development	WR	NSWC, CD : Carderock, MD	0.115	0.330	Nov 2016	0.916	Nov 2017	0.931	Nov 2018	-		0.931	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development					Project (Number/Name) 3086 I Frigate					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Warfare Systems Development	C/CPAF	Lockheed Martin : Various	0.100	1.752	Dec 2016	0.660	Dec 2017	1.530	Dec 2018	-		1.530	Continuing	Continuing	Continuing
Warfare Systems Development	Various	Various : Various	0.600	3.492	Nov 2016	2.743	Nov 2017	3.358	Nov 2018	-		3.358	Continuing	Continuing	Continuing
Warfare Systems Development	WR	Government Activites : Various	0.000	1.438	Nov 2016	2.183	Nov 2017	1.699	Nov 2018	-		1.699	0.000	5.320	-
Aviation Integration Development	WR	NAWC, AD : Patuxent River, MD	0.263	1.133	Nov 2016	1.003	Nov 2017	0.994	Nov 2018	-		0.994	Continuing	Continuing	Continuing
Aviation Integration Development	WR	NSWC, DD : Dahlgren, VA	0.000	0.116	Dec 2016	0.226	Dec 2017	0.219	Dec 2018	-		0.219	Continuing	Continuing	Continuing
Subtotal			11.434	61.670		107.679		100.741		-		100.741	Continuing	Continuing	N/A

Remarks

Ship Design Modification efforts were stopped and new conceptual design efforts and system SPECs started.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NSWC, CD : Carderock, MD	0.261	4.783	Nov 2016	6.888	Nov 2017	6.379	Nov 2018	-		6.379	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC, PD : Philadelphia, PA	0.185	2.491	Nov 2016	3.392	Nov 2017	2.848	Nov 2018	-		2.848	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC, DD : Dahlgren, VA	0.385	2.457	Nov 2016	2.644	Nov 2017	2.385	Nov 2018	-		2.385	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC, PHD : Port Hueneme, CA	0.003	0.674	Nov 2016	0.674	Nov 2017	0.551	Nov 2018	-		0.551	Continuing	Continuing	Continuing
Government Engineering Support	WR	Government Activites : Various	0.040	0.276	Nov 2016	1.879	Nov 2017	1.716	Nov 2018	-		1.716	Continuing	Continuing	Continuing
Contractor Engineering Support	C/CPAF	Booz Allen Hamilton : McLean, VA	0.545	0.511	Feb 2017	0.741	Feb 2018	0.656	Feb 2019	-		0.656	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development				Project (Number/Name) 3086 I Frigate							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	C/CPAF	CACI : Arlington, VA	0.037	0.438	Feb 2017	0.447	Nov 2017	0.340	Nov 2018	-		0.340	Continuing	Continuing	Continuing
Contractor Engineering Support	C/CPAF	Alion : Arlington, VA	0.486	1.556	Feb 2017	1.345	Feb 2018	1.256	Feb 2019	-		1.256	Continuing	Continuing	Continuing
Contractor Engineering Support	C/CPAF	Various : Various	0.875	1.085	Jan 2017	4.646	Jan 2018	4.520	Jan 2019	-		4.520	Continuing	Continuing	Continuing
Subtotal			2.817	14.271		22.656		20.651		-		20.651	Continuing	Continuing	N/A
Remarks Increase funding for FY 18 Engineering Support are due to conceptual design effort, GFI/GFE development, and Combat System development.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Model/ Hull Form Testing	WR	NSWC, CD : Carderock, MD	0.320	2.093	Nov 2016	0.257	Nov 2017	0.000		-		0.000	0.000	2.670	-
Test and Evaluation Master Plan (TEMP) Development	C/CPAF	Alion : Arlington, VA	0.130	0.420	Dec 2016	0.400	Dec 2017	0.405	Dec 2018	-		0.405	Continuing	Continuing	Continuing
Test and Evaluation Master Plan (TEMP) Development	WR	Government Activities : Various	0.000	0.000		0.450	Dec 2017	1.000	Dec 2018	-		1.000	Continuing	Continuing	Continuing
Land Based Integration & Test	TBD	TBD : TBD	0.000	0.000		0.000		1.800	Nov 2018	-		1.800	Continuing	Continuing	Continuing
Subtotal			0.450	2.513		1.107		3.205		-		3.205	Continuing	Continuing	N/A
Remarks Land Based Testing efforts were delayed a year due to program restructure.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development				Project (Number/Name) 3086 I Frigate						
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	Alion : Arlington, VA	0.786	1.373	Dec 2016	1.445	Dec 2017	1.246	Dec 2018	-		1.246	Continuing	Continuing	Continuing
Program Management Support	WR	Various : Various	3.423	3.253	Dec 2016	10.563	Dec 2017	8.929	Dec 2018	-		8.929	Continuing	Continuing	Continuing
Subtotal			4.209	4.626		12.008		10.175		-		10.175	Continuing	Continuing	N/A
Remarks			Program Management Support includes Program Office support, Cost Estimation support, Acquisition Documentation Support, Design Site funds, and Program Office travel.												
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			18.910	83.080		143.450		134.772		-		134.772	Continuing	Continuing	N/A
Remarks															

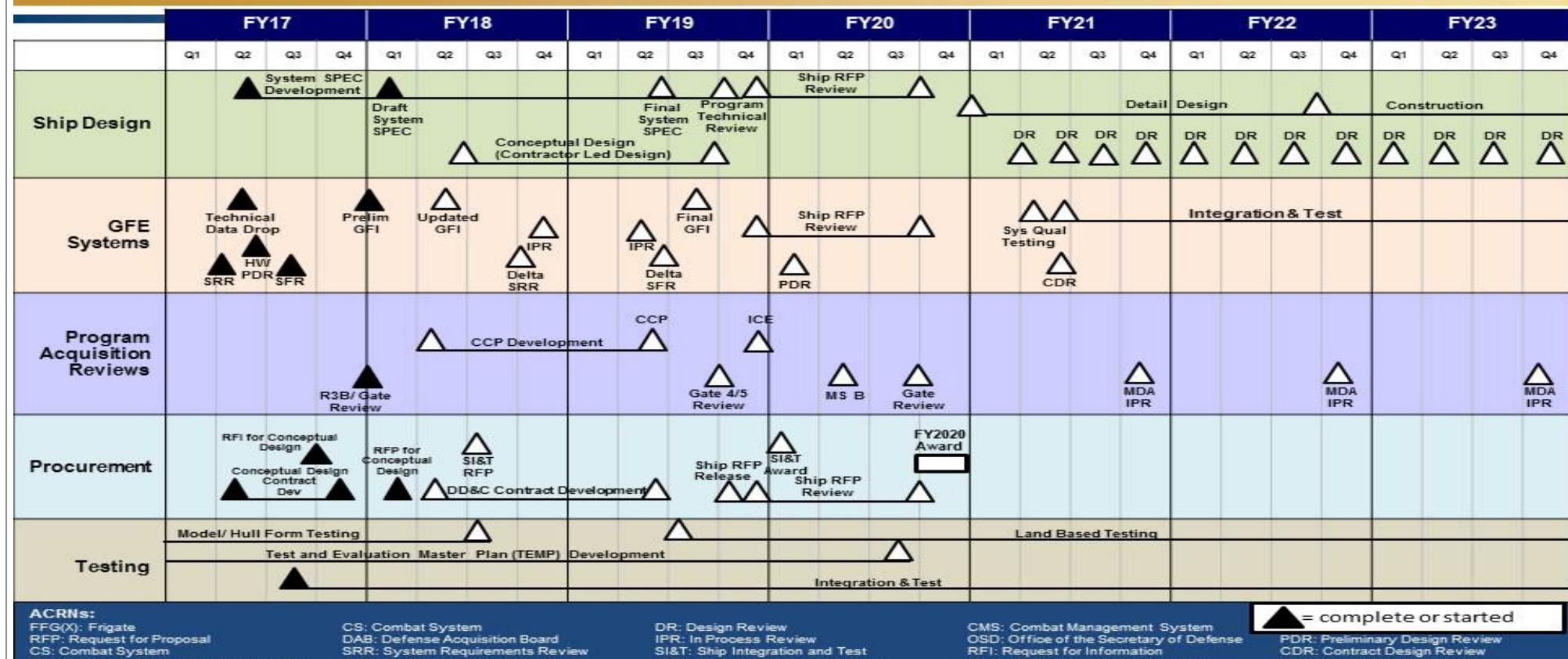
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity
1319 / 4R-1 Program Element (Number/Name)
PE 0603599N I (U)Frigate DevelopmentProject (Number/Name)
3086 I Frigate

FFG(X) Program Schedule



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603599N / (U)Frigate Development	Project (Number/Name) 3086 / Frigate		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Proj 3086				
SPEC Development		2	2017	3
Test and Evaluation Master Plan (TEMP) Development		1	2017	3
Model / Hull Form Testing		1	2017	3
Technical Data Package Data Drop		2	2017	2
CS Software System Requirements Review (SRR)		2	2017	2
Integration and Test		3	2017	4
CS Software System Functional Review (SFR)		3	2017	3
Component Cost Position (CCP) Development		2	2018	2
In Process Review (IPR) #1		4	2018	4
Draft System SPEC Approval		1	2018	1
RFP for Conceptual Design		1	2018	1
DD&C Contract Development		2	2018	2
CS Software Delta System Requirements Review (SRR)		4	2018	4
In Process Review (IPR) #2		2	2019	2
Final System SPEC Approval		3	2019	3
Program Technical Review		4	2019	4
Production RFP Released		4	2019	4
Land Based Testing		3	2019	4
CS Software Delta System Functional Review (SFR)		2	2019	2
CS Software Preliminary Design Review (PDR)		1	2020	1
RFP Review and Downselect		4	2019	3
Detail Design		1	2021	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603599N I (U)Frigate Development	Project (Number/Name) 3086 I Frigate		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	2	2021	4	2023
	2	2021	2	2021
CS Integration and Test	2	2021	2	2021
System Qualification Testing				
CS Software Critical Design Review (CDR)				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603609N / Conventional Munitions								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	230.411	8.342	8.909	9.307	-	9.307	9.988	10.761	8.768	8.941	Continuing	Continuing	
0363: Inensitive Munitions Adv. Development	230.411	8.342	8.909	8.414	-	8.414	8.434	8.628	8.768	8.941	Continuing	Continuing	
3436: AN/BST-1 Buoy Component Re-Design	0.000	0.000	0.000	0.893	-	0.893	1.554	2.133	0.000	0.000	0.000	4.580	

A. Mission Description and Budget Item Justification

Proj 0363- Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet or fragment impact, thus presenting a great hazard to ships, aircraft, and personnel. The Inensitive Munitions Advanced Development (IMAD) program will provide, validate, and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. Inensitive Munitions (IM) is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuses, and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship and platform survivability and satisfying performance and readiness requirements.

Proj 3436- The AN/BST-1 Submarine Emergency Communication Transmitter informs Navy leadership when a ballistic missile submarine is in extremis. When activated, a buoy is released from the submarine, floats to the surface and transmits an emergency signal. The energetic components in the system release the buoy from the submarine, separate protective covers and actuate an antenna for communication. The AN/BST-1 Buoy energetic component re-design will replace two antenna related explosive components that utilize explosive formulations that are no longer produced due to environmental impact. The re-design will support future procurements for OHIO and COLUMBIA class deployments. The energetic component re-design includes design, prototyping, design verification testing, environmental qualification, hazard classification, insensitive munitions and developmental testing. The two re-designed energetic components will be qualified for USN use at the conclusion of the program.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603609N / Conventional Munitions			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	8.342	8.909	8.561	-	8.561
Current President's Budget	8.342	8.909	9.307	-	9.307
Total Adjustments	0.000	0.000	0.746	-	0.746
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	0.900	-	0.900
• Rate/Misc Adjustments	0.000	0.000	-0.154	-	-0.154
Change Summary Explanation					
The FY 2019 funding request was reduced by \$0.051 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.					
FY19-FY23 \$4.6M increase due to the addition of Proj 3436 AN/BST-1 Buoy Component Re-design.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions				Project (Number/Name) 0363 / Insensitive Munitions Adv. Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0363: <i>Insensitive Munitions Adv. Development</i>	230.411	8.342	8.909	8.414	-	8.414	8.434	8.628	8.768	8.941	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program leverages are being closely coordinated with other military departments, North Atlantic Treaty Organization (NATO) and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed and through the IM strategic planning process, all Program Executive Offices (PEO) are implementing IM in their priority munitions. IM are identified as a Department of Defense (DoD) critical technology requirement and considered as part of a weapon design. The IMAD program matures the technology developed by a variety of Science and Technology (S&T) sources for program management integration into weapons systems to meet the IM technical deficiencies documented in the PEO IM Strategic Plans. IMAD provides the link between S&T programs and the program managers (PM) by optimizing IM technologies to meet Navy requirements. IMAD offers risk mitigation for the PMs in terms of IM technical knowledge, expertise and manpower with the state of the art expertise across IM products. Each technology area is divided into subtasks addressing specific munition and munition class IM deficiencies.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Title: Insensitive Munitions Adv. Development	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Validate and assess weapon systems plan of action and milestones for IM compliance. Review Insensitive Munitions Strategic Plan (IMSP) for Navy compile and analyze weapon system, energetic material and generic technology IM test data. Perform Threat Hazard Assessments (THAs). Perform analysis of energetic material properties logistic process. Review IM certification and waivers. Support Insensitive Munitions Council (IMC), Insensitive Munitions Coordination Group (IMCG), and IMC Working Group. Support and develop Insensitive Munitions Technology Tool (IMT2). Support North Atlantic Treaty Organization Standardization Agreement (NATO STANAG) and Advanced Operations (AOP) development. Support IMAD program briefs. Support all Navy Joint Services Insensitive Munitions Technical Panel (JSIMTP) meetings. Support Explosive Safety Working Group (ESWG) meetings. Provide task management support for financial management, review of programmatic deliverables and overall task coordination.		8.342	8.909	8.414	0.000	8.414
FY 2018 Plans: FY 2018 plans are to:		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions	Project (Number/Name) 0363 / Insensitive Munitions Adv. Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Evaluate and demonstrate improved solid propellant for Insensitive Munition (IM) compliant rocket motor systems and container cook off migration. Evaluate and demonstrate new rocket motor case technology that can significantly reduce reaction violence of missile and rocket propulsion systems exposed to unplanned stimuli. Develop, demonstrate, and qualify new rocket propellant formulations that meet and/or improve system performance for air launched weapons and meet and/or improve IM goals. Develop, demonstrate, and qualify new gun propellant formulations for Hyper Velocity Projectile (HVP) that meet and/or improve system performance and meet and/or improve IM goals. Evaluate new ordnance and container concepts. Qualify next generation area attack weapon fragment impact evaluation. Evaluate azobis isobutyronitrile (AIBN) as a replacement of t-butylperoxy (2-ethylhexanoate) (TBP) in the manufacturing of PBXN-112 and PBXC-139. Evaluation, demonstration, and qualification of new explosives that reduce collateral damage when bombs are exposed to thermal and impact threats. Develop and demonstrate new and improved stowage and container materials that achieve compliance with IM criteria while significantly reducing the logistics footprint by lowering system weight. Demonstrate SCO and FI of the EXTL-65 Propellant in a HVPW rocket motor. Develop and demonstrate ballistic barrier concepts to improve or eliminate IM impact threats in logistical transportation and storage conditions. Evaluate Shoulder-launched Assault Munitions IM (combined effects). Evaluate qualification potential of explosives using new resonant acoustic mixing (RAM) of explosive ingredients. Develop and demonstrate new and improved explosive initiation systems that improve IM and reliably initiate IM explosives. Evaluate qualification potential of explosives using new resonant acoustic mixing (RAM) of explosive ingredients.						
FY 2019 Base Plans: FY 2019 plans are to:		Evaluate and demonstrate improved solid propellant for Insensitive Munitions (IM) compliant rocket motor systems and container cook off migration. Evaluate and demonstrate new rocket motor case technology that can significantly reduce reaction violence of missile and rocket propulsion systems exposed to unplanned stimuli. Develop, demonstrate, and qualify new rocket propellant formulations that meet and/or improve system performance for air launched weapons and meet and/or improve IM goals. Develop, demonstrate, and qualify a Reduced Sensitivity Solventless Gun Propellant. Evaluate new ordnance and container concepts. Qualify next generation area attack weapon fragment impact evaluation. Evaluate Slow Heating Oven Designs. Demonstrate IM Improvement through Integral Rocket Solid Fuel Ramjet Technology. Evaluation, demonstration, and qualification of new explosives that reduce collateral damage when bombs are exposed to thermal and impact threats. Develop and demonstrate new and improved stowage and container materials that achieve compliance with IM criteria while significantly reducing the logistics footprint by lowering system				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions	Project (Number/Name) 0363 / Insensitive Munitions Adv. Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
weight. Develop and demonstrate new sensors that will detect and indicate thermal events real time. The sensor can provide warning signal and be capable to initiate venting systems. Develop and demonstrate ballistic barrier concepts to improve or eliminate IM impact threats in logistical transportation and storage conditions.						
Develop and demonstrate new and improved explosive initiation systems that improve IM and reliably initiate IM explosives. Evaluate qualification potential of explosives using new resonant acoustic mixing (RAM) of explosive ingredients.						
Develop and demonstrate new and improved explosive initiation systems that improve IM and reliably initiate IM explosives.						
Evaluate qualification potential of explosives using new resonant acoustic mixing (RAM) of explosive ingredients.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.						
Accomplishments/Planned Programs Subtotals		8.342	8.909	8.414	0.000	8.414
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
IMAD is assigned as a non-ACAT program and therefore does not have program milestones like the ACAT I to IV programs. IMAD develops and evaluates IM technologies for use in Navy weapon systems and is not part of a particular weapon acquisition program						
E. Performance Metrics						
Quarterly program reviews						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions						Project (Number/Name) 0363 / Insensitive Munitions Adv. Development					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PROPELLER DEV. AND EVAL.	WR	NAWC DIV/CHINA LAKE : WX	99.652	3.100	Nov 2016	3.419	Nov 2017	3.373	Nov 2018	-		3.373	Continuing	Continuing	Continuing
EXPLOSIVES DEV. AND EVAL.	WR	NSWC/INDIAN HEAD DIV. : WX	84.366	2.016	Nov 2016	2.151	Nov 2017	2.002	Nov 2018	-		2.002	Continuing	Continuing	Continuing
ORDNANCE DEV. AND EVAL.	WR	NSWC/DAHlgren : WX	26.352	1.097	Nov 2016	1.171	Nov 2017	1.025	Nov 2018	-		1.025	Continuing	Continuing	Continuing
GUN PROPULSION AND EVAL.	WR	NSWC/INDIAN HEAD DIV. : WX	9.531	1.176	Nov 2016	1.255	Nov 2017	1.015	Nov 2018	-		1.015	Continuing	Continuing	Continuing
Subtotal			219.901	7.389		7.996		7.415		-		7.415	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PROGRAM MANAGEMENT SUPT	WR	NOSSA : IN HEAD MD	6.121	0.175	Nov 2016	0.192	Nov 2017	0.209	Nov 2018	-		0.209	Continuing	Continuing	Continuing
PROGRAM MANAGEMENT SUPPORT	MIPR	DTIC : FT BELVOIR VA	4.389	0.778	Nov 2016	0.721	Nov 2017	0.790	Nov 2018	-		0.790	Continuing	Continuing	Continuing
Subtotal			10.510	0.953		0.913		0.999		-		0.999	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			230.411	8.342		8.909		8.414		-		8.414	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603609N / Conventional Munitions					0363 / Inensitive Munitions Adv. Development											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 0363		Insensitive Munitions Adv. Development: TBD																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603609N / <i>Conventional Munitions</i>	Project (Number/Name) 0363 / <i>Insensitive Munitions Adv. Development</i>	
Schedule Details			
Events by Sub Project		Start	End
<i>Proj 0363</i>		Quarter	Year
Insensitive Munitions Adv. Development: TBD		1	2017
		1	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions					Project (Number/Name) 3436 / AN/BST-1 Buoy Component Re-Design			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3436: AN/BST-1 Buoy Component Re-Design	0.000	0.000	0.000	0.893	-	0.893	1.554	2.133	0.000	0.000	0.000	4.580	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			
A. Mission Description and Budget Item Justification													
The AN/BST-1 Submarine Emergency Communication Transmitter informs Navy leadership when a ballistic missile submarine is in extremis. When activated, a buoy is released from the submarine, floats to the surface and transmits an emergency signal. The energetic components in the system release the buoy from the submarine, separate protective covers and actuate an antenna for communication. The AN/BST-1 Buoy energetic component re-design will replace two antenna related explosive components that utilize explosive formulations that are no longer produced due to environmental impact. The re-design will support future procurements for OHIO and COLUMBIA class deployments. The energetic component re-design includes design, prototyping, design verification testing, environmental qualification, hazard classification, insensitive munitions and developmental testing. The two re-designed energetic components will be qualified for Navy use at the conclusion of the program.													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
Title: Systems Engineering and Testing Articles: 0.000 0.000 0.893 0.000 0.893 FY 2018 Plans: None, program is FY19 new start. FY 2019 Base Plans: -Award contract for designing and testing prototypes. -Finalize design and complete prototype testing in FY2019. -Supporting design verification testing and qualification in FY2020 and FY2021. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: Increase due to program being a new start in FY19.													
Accomplishments/Planned Programs Subtotals													
0.000 0.000 0.893 0.000 0.893													
C. Other Program Funding Summary (\$ in Millions)													
N/A													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603609N / <i>Conventional Munitions</i>	Project (Number/Name) 3436 / <i>AN/BST-1 Buoy Component Re-Design</i>
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy The AN/BST-1 Buoy energetic component re-design will be directed by government activities teaming with industry for design and production support. The re-designed components will be qualified for Navy use in FY2022.		
E. Performance Metrics Quarterly Program Reviews and semi-annual Design Reviews.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions						Project (Number/Name) 3436 / AN/BST-1 Buoy Component Re-Design			
Product Development (\$ in Millions)															
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract	
Produce Drawings, Prototypes and Test	C/CPFF	TBD : Not Specified	0.000	0.000		0.000		0.586	Mar 2019	-	0.586	3.200	3.786	4.400	
Subtotal			0.000	0.000		0.000		0.586		-	0.586	3.200	3.786	N/A	
Support (\$ in Millions)															
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	Award Date	FY 2018 Cost	Award Date	FY 2019 Base Cost	Award Date	FY 2019 OCO Cost	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Engineering Services	WR	NSWC, IHEODTD : Indian Head, MD	0.000	0.000		0.000		0.252	Oct 2018	-	0.252	0.500	0.752	-	
Government Engineering Services	WR	NSWC, Crane : Crane, IN	0.000	0.000		0.000		0.055	Oct 2018	-	0.055	0.100	0.155	-	
Subtotal			0.000	0.000		0.000		0.307		-	0.307	0.600	0.907	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		0.893		-	0.893	3.800	4.693	N/A	
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy														Date: February 2018									
Appropriation/Budget Activity							R-1 Program Element (Number/Name)							Project (Number/Name)									
1319 / 4							PE 0603609N / Conventional Munitions							3436 / AN/BST-1 Buoy Component Re-Design									
Proj 3436																							
FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Update performance specification award																							
Contract for Prototype/Design/Qualification																							
Design Drawings/Specifications																							
Prototype Build/Testing																							
Procure Long Lead Hardware																							
Build Design Verification Test Units																							
Conduct Design Verification Testing																							
Build Qualification Hardware																							
Environmental Qualification Testing																							
System Testing																							
Hazard Classification/Insensitive Munitions Testing																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603609N / Conventional Munitions	Project (Number/Name) 3436 / AN/BST-1 Buoy Component Re-Design

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3436				
Update performance specification award Contract for Prototype/Design/Qualification	1	2019	2	2019
Design Drawings/Specifications	2	2019	4	2019
Prototype Build/Testing	3	2019	1	2020
Procure Long Lead Hardware	1	2020	2	2020
Build Design Verification Test Units	3	2020	4	2020
Conduct Design Verification Testing	4	2020	1	2021
Build Qualification Hardware	1	2021	3	2021
Environmental Qualification Testing	3	2021	4	2021
System Testing	4	2021	1	2022
Hazard Classification/Insensitive Munitions Testing	4	2021	1	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603611M / Marine Corps Assault Vehicles								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	426.229	131.381	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	557.610	
0025: Amphibious Combat Vehicle 1.1	426.229	131.381	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	557.610	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): P472													
Note													
ACV Increment 1.1 leverages and continues the work that was previously accomplished under the Marine Personnel Carrier (MPC) program, funded in PE 0206623M; Project 9C85.													
Beginning in FY 2018, the program funding transitions from Program Element 0603611M Marine Corps Assault Vehicles to Program Element 0605611M MC AVS Development and Demonstration as the program proceeds through the acquisition process.													
A. Mission Description and Budget Item Justification													
The Amphibious Combat Vehicle is an armored personnel carrier, balanced in performance, protection, and payload for employment within the Ground Combat Element (GCE) and throughout the range of military operations, to include a swim capability.													
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
Previous President's Budget		158.682	0.000	0.000	-	0.000					0.000		
Current President's Budget		131.381	0.000	0.000	-	0.000					0.000		
Total Adjustments		-27.301	0.000	0.000	-	0.000					0.000		
• Congressional General Reductions		-	-										
• Congressional Directed Reductions		-	-										
• Congressional Rescissions		-	-										
• Congressional Adds		-	-										
• Congressional Directed Transfers		-	-										
• Reprogrammings		-3.588	0.000										
• SBIR/STTR Transfer		-3.794	0.000										
• Rate/Misc Adjustments		0.001	0.000		0.000						0.000		
• Congressional Directed Reductions		-19.920	-	-	-	-					-		
Adjustments													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603611M / <i>Marine Corps Assault Vehicles</i>
Change Summary Explanation Beginning in FY 2018, the program funding transitions from Program Element 0603611M Marine Corps Assault Vehicles to Program Element 0605611M MC AVS Development and Demonstration as the program proceeds through the acquisition process.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603611M / Marine Corps Assault Vehicles				Project (Number/Name) 0025 / Amphibious Combat Vehicle 1.1			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0025: Amphibious Combat Vehicle 1.1	426.229	131.381	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	557.610
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: P472												
A. Mission Description and Budget Item Justification												
The Amphibious Combat Vehicle is an armored personnel carrier, balanced in performance, protection, and payload for employment within the Ground Combat Element (GCE) and throughout the range of military operations, to include a swim capability. Funds support Amphibious Combat Vehicle (ACV) Increment 1.1 Engineering, Manufacturing and Development (EMD) contracts, Test & Evaluation (T&E) activities and associated program support.												
ACV Increment 1.1 leverages and continues the work previously accomplished under the Marine Personnel Carrier (MPC) program, funded in PE 0206623M; Project 9C85.												
Beginning in FY 2018, the program funding transitions from Program Element 0603611M Marine Corps Assault Vehicles to Program Element 0605611M MC AVS Development and Demonstration as the program proceeds through the acquisition process.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Title: Product Development Description: System design and development; EMD test vehicle manufacturing; prime contractor Developmental and Operational test, and Logistics Management Information (LMI) data development. FY 2018 Plans: N/A FY 2019 Base Plans: N/A FY 2019 OCO Plans: N/A							Articles: 88.122	0.000	0.000	0.000	0.000	
Title: Management Services Description: System design and development; EMD test vehicle manufacturing; prime contractor Developmental and Operational test, and Logistics Management Information (LMI) data development. FY 2018 Plans: N/A FY 2019 Base Plans: N/A FY 2019 OCO Plans: N/A							Articles: - 10.520	0.000	0.000	0.000	0.000	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603611M / Marine Corps Assault Vehicles	0025 / Amphibious Combat Vehicle 1.1				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Description: Contract Advisory and Assistance Services (Engineering and Technical Support, Management Support Services, and Studies and Analyses).</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Base Plans: N/A</p> <p>FY 2019 OCO Plans: N/A</p>						
<p>Title: Test & Evaluation</p> <p>Description: Government Developmental, Operational, and Live Fire Test and Evaluation activities.</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Base Plans: N/A</p> <p>FY 2019 OCO Plans: N/A</p>		Articles: 25.540 -	0.000 -	0.000 -	0.000 -	0.000 -
<p>Title: Program Support</p> <p>Description: Government labor, material, and travel for integrated logistics support, technical publications, support equipment development, in-house technical support, and program management support.</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Base Plans: N/A</p> <p>FY 2019 OCO Plans:</p>		Articles: 7.199 -	0.000 -	0.000 -	0.000 -	0.000 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603611M / Marine Corps Assault Vehicles				Project (Number/Name) 0025 / Amphibious Combat Vehicle 1.1			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
N/A											
Accomplishments/Planned Programs Subtotals						131.381	0.000	0.000	0.000	0.000	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PMC/2025: <i>Amphibious Combat Vehicle 1.1</i>	0.000	161.511	167.478	-	167.478	286.098	507.400	0.000	0.000	0.000	1,122.487
• PMC/7000/0605611M-1: <i>Initial Spares - ACV 1.1</i>	0.000	5.569	6.145	-	6.145	13.960	13.643	0.000	0.000	0.000	39.317
• RDT&E/0605611M/0025: <i>Amphibious Combat Vehicle 1.1</i>	0.000	178.993	42.448	-	42.448	19.703	0.462	0.000	0.000	0.000	241.606
• RDT&E/0605611M/0026: <i>Amphibious Combat Vehicle 1.2</i>	0.000	0.000	55.775	-	55.775	57.978	57.477	43.533	8.341	0.000	223.104
• PMC/2026: <i>Amphibious Combat Vehicle 1.2</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	710.373	701.456	Continuing	Continuing
• PMC/7000/0605611M: <i>Initial Spares - ACV 1.2</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	19.346	19.773	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
The program office awarded two competitive Engineering, Manufacturing and Development (EMD) contracts to two vendors to build 16 test vehicles each (32 total). ACV Increment 1.1 entered the acquisition cycle at Milestone B in FY 2016 and will down-select to one vendor at Milestone C. In FY 2018, the program will enter into Low Rate Initial Production (LRIP) and Full Rate Production (FRP) will begin in FY 2020.											
E. Performance Metrics											
Milestone Reviews Milestone B: 1QFY16 Milestone C: 3QFY18											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603611M / Marine Corps Assault Vehicles				Project (Number/Name) 0025 / Amphibious Combat Vehicle 1.1							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Design & Development	C/FPIF	Various : Various	316.825	88.122	Jan 2017	0.000		0.000		-		0.000	0.000	404.947	-
Other Product Development	C/FFP	SPAWAR/ NEW JERSEY : Charleston/Picatinny	13.844	0.000		0.000		0.000		-		0.000	0.000	13.844	-
Prior Years Cumulative Funding	Various	Various : Various	18.506	0.000		0.000		0.000		-		0.000	0.000	18.506	-
Subtotal			349.175	88.122		0.000		0.000		-		0.000	0.000	437.297	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation - EMD Detailed Planning	WR	AVTB : Camp Pendleton, CA	1.069	0.000		0.000		0.000		-		0.000	0.000	1.069	-
Propulsion System Demonstrator	WR	NSWC Carderock - SSES Philly : Philadelphia, PA	1.193	0.000		0.000		0.000		-		0.000	0.000	1.193	-
Integrated Logistics Support	WR	NSWC - Dahlgren : Dahlgren, VA	1.473	0.616	Apr 2017	0.000		0.000		-		0.000	0.000	2.089	-
Technical Data & Pubs Development	WR	NSWC Carderock : Philadelphia, PA	0.050	0.100	Sep 2017	0.000		0.000		-		0.000	0.000	0.150	-
GFP Management	WR	SPAWAR Charleston : SPAWAR Charleston	23.843	6.233	Apr 2017	0.000		0.000		-		0.000	0.000	30.076	-
Travel	Various	Various : Various	0.791	0.250	Sep 2017	0.000		0.000		-		0.000	0.000	1.041	-
Subtotal			28.419	7.199		0.000		0.000		-		0.000	0.000	35.618	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603611M / Marine Corps Assault Vehicles				Project (Number/Name) 0025 / Amphibious Combat Vehicle 1.1								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Operational Test Evaluation (OT&E)	WR	MCOTEA : Quantico, Va	0.258	1.950	Jan 2017	0.000		0.000		-		0.000	0.000	2.208	-	
Development Test & Evaluation	WR	Various : Various	2.740	18.721	Jan 2017	0.000		0.000		-		0.000	0.000	21.461	-	
Live Fire Test & Evaluation	WR	Various : Various	2.487	4.869	Jan 2017	0.000		0.000		-		0.000	0.000	7.356	-	
	Subtotal		5.485	25.540		0.000		0.000		-		0.000	0.000	31.025	N/A	
Remarks																
* The FY 2017 award date for cost categories with various activities is the actual obligation date for the last award in the category.																
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Engineering and Technical Services	C/FFP	Various : Various	17.509	1.666	Jul 2017	0.000		0.000		-		0.000	0.000	19.175	-	
Management Support Services	C/FFP	DDG : Stafford VA	19.326	8.854	Mar 2017	0.000		0.000		-		0.000	0.000	28.180	-	
Studies and Analyses	C/FFP	Various : Various	6.315	0.000		0.000		0.000		-		0.000	0.000	6.315	-	
	Subtotal		43.150	10.520		0.000		0.000		-		0.000	0.000	53.670	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				426.229	131.381		0.000		0.000		-		0.000	0.000	557.610	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

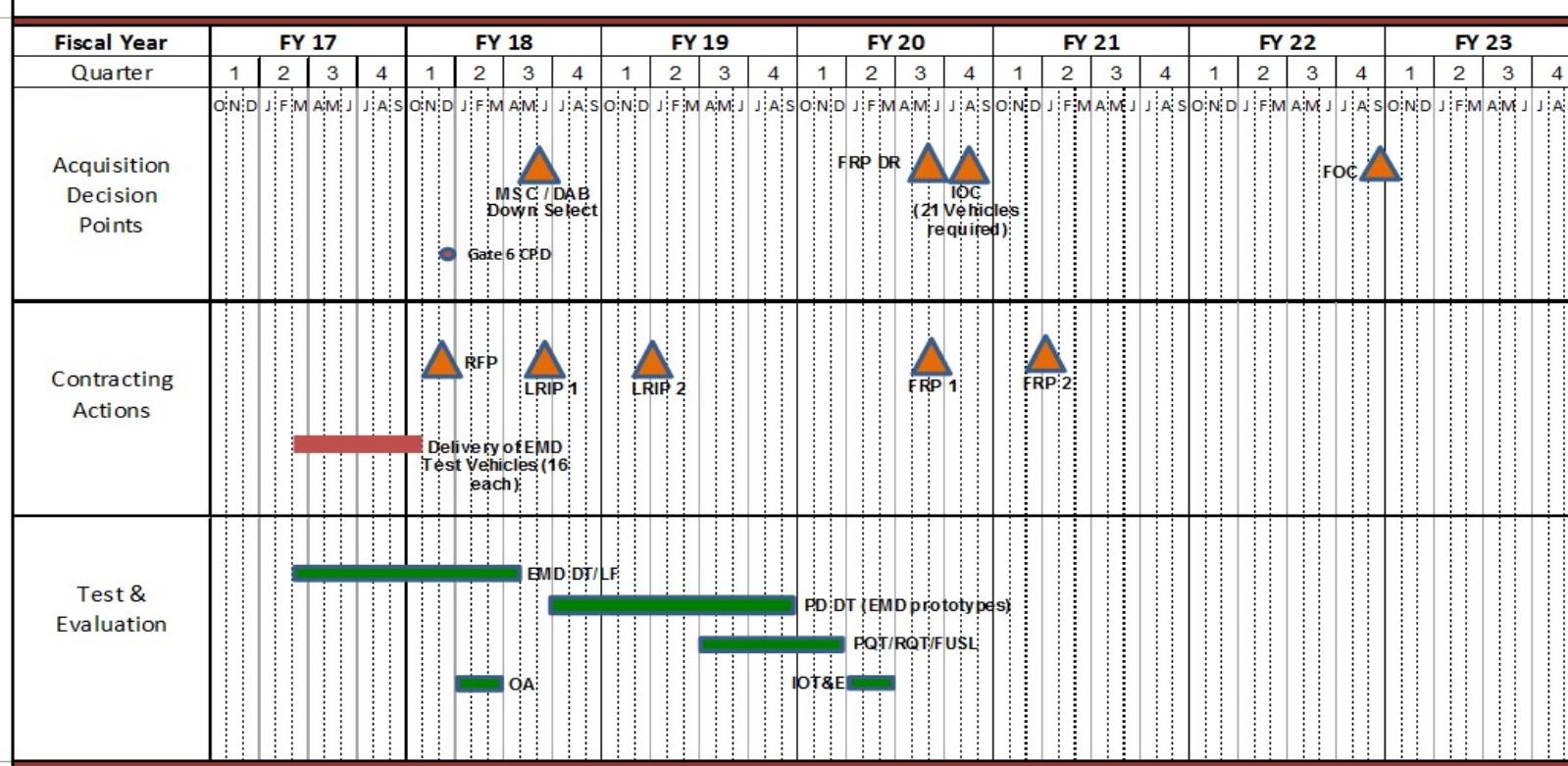
R-1 Program Element (Number/Name)

PE 0603611M / Marine Corps Assault
Vehicles

Project (Number/Name)

0025 / Amphibious Combat Vehicle 1.1

ACV 1.1 PB-19 PROGRAM SCHEDULE



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603611M / Marine Corps Assault Vehicles	Project (Number/Name) 0025 / Amphibious Combat Vehicle 1.1

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0025				
EMD Vehicle Delivery (32 Vehicles)	2	2017	1	2018
Vehicle Acceptance Review	2	2017	1	2018
Development Test/Live Fire Test	2	2017	1	2020
Tactics, Techniques, and Procedures (TTP) Development	3	2017	4	2017
Production Readiness Review (PRR)	1	2018	1	2018
Operational Assessment (OA)	2	2018	3	2018
System Verification Review (SVR)	2	2018	2	2018
JROC Capabilities Production Document (CPD)	3	2018	3	2018
MS C/DAB Down Select	3	2018	3	2018
LRIP Option 1 Exercised	3	2018	3	2018
Physical Configuration Audit (PCA)	4	2019	4	2019
LRIP Option 2 Exercised	2	2019	2	2019
Initial Operational Test & Evaluation (IOT&E)/Full Up System Level (FUSL)	2	2020	2	2020
Full Rate Production (FRP) Decision	3	2020	3	2020
FRP #1 Option Exercised	3	2020	3	2020
Initial Operational Capability (IOC)	4	2020	4	2020
FRP #2 Option Exercised	2	2021	2	2021
Full Operational Capability (FOC)	4	2022	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)									
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603635M / Marine Corps Grnd Cmbt/Supt Sys									
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
Total Program Element	33.891	1.043	1.428	1.828	-	1.828	1.855	1.886	1.915	1.943	Continuing	Continuing		
1964: Anti-Armor Weapon System	4.097	0.776	1.023	0.962	-	0.962	0.980	1.004	1.026	1.047	Continuing	Continuing		
2614: SMAW Follow-On	29.794	0.267	0.405	0.866	-	0.866	0.875	0.882	0.889	0.896	Continuing	Continuing		
A. Mission Description and Budget Item Justification														
This PE supports the demonstration and validation of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations. This program is funded under Demonstration & Validation because it develops and integrates hardware for experimental tests related to specific ground weapon systems.														
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget				1.303	1.428	1.355	-	-						
Current President's Budget				1.043	1.428	1.828	-	-						
Total Adjustments				-0.260	0.000	0.473	-	-						
• Congressional General Reductions				-	-	-	-	-						
• Congressional Directed Reductions				-	-	-	-	-						
• Congressional Rescissions				-	-	-	-	-						
• Congressional Adds				-	-	-	-	-						
• Congressional Directed Transfers				-	-	-	-	-						
• Reprogrammings				-0.228	0.000	-	-	-						
• SBIR/STTR Transfer				-0.032	0.000	-	-	-						
• Rate/Misc Adjustments				0.000	0.000	0.473	-	-						
Change Summary Explanation														
The increase in funding from FY17 to FY18 is due to efforts to improve the Saber power system and the Global Positioning System (GPS) of the Saber system.														
The decrease in funding from FY18 to FY19 is due to efforts to improve the Saber power system and the Global Positioning System (GPS) of the Saber system in FY18.														

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018					
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4					PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys				1964 / Anti-Armor Weapon System							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
1964: Anti-Armor Weapon System	4.097	0.776	1.023	0.962	-	0.962	0.980	1.004	1.026	1.047	Continuing	Continuing				
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-						
A. Mission Description and Budget Item Justification																
The M41A7 Saber system is the primary heavy, anti-armor launch system for the TOW Missile within the Ground Combat Element of the Marine Corps. The Anti-Armor Weapons System-Heavy (AAWS-H) program, working in concert with the U.S. Army, will develop and integrate technology improvements into the Improved Target Acquisition System (ITAS) to meet Increment II system requirements as jointly agreed. Improvements centered on integration of sight image enhancements were concluded in FY13. Other efforts have focused on providing engineering and technical support such as the study of densified propellant and battery replacement for the Saber system (far-target location accuracy improvements). Laser designation capability has been postponed due to prioritization.																
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)																
Title: Saber Battery Replacement											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Articles:											0.557	0.508	0.562	0.000	0.562	
FY 2018 Plans:											-	-	-	-	-	
-Continue research of a replacement battery for Saber to address safety concerns, while maintaining the same or increased capabilities for power and longevity. This is an on-going effort through FY19.																
FY 2019 Base Plans:																
-Continue efforts for Saber battery through reliability testing to enhance capabilities.																
-Initiate qualification testing of the replacement battery for Saber.																
FY 2019 OCO Plans:																
N/A																
FY 2018 to FY 2019 Increase/Decrease Statement:																
No significant change from FY 2018 to FY 2019.																
Title: Management Support											Articles:	0.000	0.420	0.200	0.000	0.200
Description: The decrease in funding from FY18 to FY19 (\$0.220M) is due to reduced management support efforts.											-	-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018					
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys	Project (Number/Name) 1964 / Anti-Armor Weapon System					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								
			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
FY 2018 Plans: -Initiate support for product improvement upgrades for the Saber System, engineering, logistics, and program office support.								
FY 2019 Base Plans: -Continue support for product improvement upgrades for the Saber System, engineering, logistics, and program office support. -Initiate support for qualification testing of the replacement battery for Saber.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.								
Title: Global Positioning System (GPS) Improvement			Articles:	0.219	0.095	0.200	0.000	0.200
FY 2018 Plans: -Continue research for improvements to future GPS for the Saber system. -Continue prototype testing of the Far-Target Locator and assess results.								
FY 2019 Base Plans: -Continue research for improvements to future GPS for the Saber system. -Continue prototype testing of the Far-Target Locator and assess results. -Initiate the review of Army test reports and prototypes for Marine Corps evaluation.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.								
Accomplishments/Planned Programs Subtotals								

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys					Project (Number/Name) 1964 / Anti-Armor Weapon System	
C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete
• PMC/3017: Anti-Armor Weapon Systems-Heavy	17.080	56.577	59.702	-	59.702	39.092	40.968	42.956	33.778	Continuing
Remarks										
D. Acquisition Strategy The Saber system is a joint program with the U.S. Army. Funding supports the development, integration, and qualification of incremental improvements to meet objective requirements and assesses emergent technologies.										
E. Performance Metrics N/A										

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys						Project (Number/Name) 1964 / Anti-Armor Weapon System			
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti Armor	WR	NSWC Indian Head : Indian Head, MD	2.622	0.000		0.000		0.000		-		0.000	0.000	2.622	-
Saber Battery Replacement Testing and Research	WR	NSWC Crane : Crane, IN	1.475	0.557	Oct 2016	0.508	Jan 2018	0.562	Feb 2019	-		0.562	0.000	3.102	-
Global Positioning System (GPS) Improvement	MIPR	CCWS Redstone Arsenal : Huntsville, AL	0.000	0.219	Feb 2017	0.095	Apr 2018	0.200	Apr 2019	-		0.200	Continuing	Continuing	Continuing
Subtotal		4.097	0.776		0.603		0.762		-			0.762	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Support	C/FFP	Not Specified : Not Specified	0.000	0.000		0.420	Mar 2018	0.200	Mar 2019	-		0.200	0.000	0.620	-
Subtotal		0.000	0.000		0.420		0.200		-			0.200	0.000	0.620	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			4.097	0.776		1.023		0.962		-		0.962	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys					1964 / Anti-Armor Weapon System											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 1964																					
Saber Battery Replacement: Saber Battery Replacement																					
GPS Improvement: Future GPS Improvement																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys	Project (Number/Name) 1964 / Anti-Armor Weapon System	
Schedule Details			
Events by Sub Project	Start Quarter	End Year	
<i>Proj 1964</i>			
Saber Battery Replacement: Saber Battery Replacement	1	2017	2
GPS Improvement: Future GPS Improvement	2	2017	4
			2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys				Project (Number/Name) 2614 / SMAW Follow-On				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2614: SMAW Follow-On	29.794	0.267	0.405	0.866	-	0.866	0.875	0.882	0.889	0.896	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Follow on to Shoulder-Launched Multipurpose Assault Weapon (SMAW) (FOTS):

The solution to the Follow on to SMAW (FOTS) capability requirement is a Family of Marine-portable Rocket Systems. This Family of Systems is composed of separate lightweight, short range, fire-and-forget weapons. Marine Expeditionary Forces will employ the Family of Systems across the spectrum of conflict, under all environmental conditions, to neutralize or destroy a variety of ground targets including personnel, thin-skinned vehicles, and positions. The Family of Systems include various systems, such as SMAW Mod 2 and M3A1 Multi-purpose Anti-Armor Weapon System (MAAWS), with future capability for expansion to additional systems. SMAW Mod 2 consists of a new launcher with an integrated laser range finder and thermal sight. MAAWS consists of a new launcher and integrated fire control system. Future systems and capabilities include similar Marine-portable fire-and-forget shoulder-launched rocket systems with anti-armor, anti-personnel, anti-material, and assault capabilities.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Engineer and technical support. FY 2018 Plans: -Continue engineering support for the development and testing of the Densified Propellant. -Continue qualification of Densified Propellant in accordance with Technology Transition Agreement (TTA). -Continue development of replacement bore sight kit. -Continue qualification of current millijoule meter. -Initiate MAAWS qualification, performance testing and Marine-specific tests include E3 and Navy/Marine Corps transportation requirements unique to the Marine Corps. Other Marine-unique tests may include support equipment and potential modifications to existing FOTS support equipment. FY 2019 Base Plans: -Continue engineering support for the development and testing of the Densified Propellant. -Continue qualification of Densified Propellant in accordance with Technology Transition Agreement (TTA). -Continue development of replacement bore sight kit. -Complete qualification of current millijoule meter. -Initiate integration and transition of Densified Propellant and other technology developments into the program.	0.267 Articles: - -	0.405 Articles: - -	0.866 Articles: - -	0.000 Articles: - -	0.866 Articles: - -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys					Project (Number/Name) 2614 / SMAW Follow-On						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)															
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total										
-Continue MAAWS qualification, performance testing and Marine-specific tests include E3 and Navy/Marine Corps transportation requirements unique to the Marine Corps. Other Marine-unique tests may include support equipment and potential modifications to existing FOTS support equipment.															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$0.461 supports development and qualification of upgraded components to the SMAW MOD 2 system and the M3A1 Multi-purpose Anti-Armor Weapon System (MAAWS), with future capability for expansion to additional systems.															
Accomplishments/Planned Programs Subtotals						0.267	0.405	0.866	0.000	0.866					
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• PMC/3016: <i>Follow on to SMAW</i>	22.918	25.174	13.760	-	13.760	13.789	13.810	13.828	13.839	Continuing	Continuing				
Remarks															
D. Acquisition Strategy Strategy is to complete development and qualification of upgraded components to the SMAW MOD 2 system and M3A1 Multi-purpose Anti-Armor Weapon System (MAAWS), with future capability for expansion to additional systems. SMAW Mod 2 consists of a new launcher with an integrated laser range finder and thermal sight. MAAWS consists of a new launcher and integrated fire control system. Future systems and capabilities include similar Marine-portable fire-and-forget shoulder-launched rocket systems with anti-armor, anti-personnel, anti-material, and assault capabilities. MAAWS test efforts in conjunction with the Army include qualification and performance testing. In addition, Marine-specific tests include E3 and Navy/Marine Corps transportation requirements unique to the Marine Corps. Other Marine-unique tests may include support equipment and potential modifications to existing FOTS support equipment.															
E. Performance Metrics Milestone reviews and technical reviews.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys				Project (Number/Name) 2614 / SMAW Follow-On							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Cumulative Funding	Various	Various : Various	1.748	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	1.748	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Cumulative Funding	Various	Various : Various	16.300	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Technical Support	WR	NSWC Indian Head : Indian Head, VA	0.841	0.145	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Technical Support	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.122	Jan 2017	0.405	Jan 2018	0.866	Jan 2019	-		0.866	0.000	1.393	-
		Subtotal	17.141	0.267		0.405		0.866		-		0.866	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Testing & Support	WR	Marine Corps Operational Test & Eval Activity : Quantico, VA	5.164	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Prior year cumulative funding	Various	Various : Various	0.326	0.000		0.000		0.000		-		0.000	0.000	0.326	-
		Subtotal	5.490	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy											Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys				Project (Number/Name) 2614 / SMAW Follow-On								
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Prior year cumulative funding	Various	Various : Various	5.415	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
Subtotal			5.415	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				29.794	0.267		0.405		0.866		-		0.866	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)									
1319 / 4					PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys					2614 / SMAW Follow-On									
Proj 2614																			
FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Densified Propellant Development: Densified Propellant Development	[REDACTED]																		
Densified Propellant Development: Densified Propellant Development - Continued	[REDACTED]																		
Densified Propellant Qualification: Densified Propellant Qualification	[REDACTED]																		
Densified Propellant System Verification Review: Densified Propellant System Verification Review	[REDACTED]																		
Densified Propellant Developmental Testing: Densified Propellant Developmental Testing	[REDACTED]																		
Densified Propellant Engineering Change Proposal: Densified Propellant Engineering Change Proposal	[REDACTED]																		
Millijoule Meter: Millijoule Meter	[REDACTED]																		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603635M / Marine Corps Grnd Cmbt/ Supt Sys	Project (Number/Name) 2614 / SMAW Follow-On

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2614				
Densified Propellant Development: Densified Propellant Development	1	2017	4	2017
Densified Propellant Development: Densified Propellant Development - Continued	1	2018	4	2018
Densified Propellant Qualification: Densified Propellant Qualification	1	2018	4	2020
Densified Propellant System Verification Review: Densified Propellant System Verification Review	1	2019	4	2020
Densified Propellant Developmental Testing: Densified Propellant Developmental Testing	3	2019	2	2020
Densified Propellant Engineering Change Proposal: Densified Propellant Engineering Change Proposal	3	2021	3	2021
Millijoule Meter: Millijoule Meter	1	2017	4	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603654N / JT Service Explosive Ordn Dev							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	582.764	48.686	83.067	43.148	13.900	57.048	51.725	38.381	36.287	47.074	Continuing	Continuing
0377: JT Service Expl Ord Disp System	365.499	13.540	13.572	7.839	-	7.839	18.192	6.034	6.683	11.377	Continuing	Continuing
1317: EOD Diving System	107.448	6.467	5.113	4.357	-	4.357	4.527	4.621	3.977	4.816	Continuing	Continuing
3177: Joint Counter Radio-Controlled IED Elec Warfare	0.000	13.194	45.264	14.016	13.900	27.916	11.414	11.731	9.755	12.155	Continuing	Continuing
4023: VSW MCM/Force Protection UUV	109.817	15.485	19.118	16.936	-	16.936	17.592	15.995	15.872	18.726	Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a Joint Service Program.

This program provides for the development of Explosive Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program.

Proliferation of sophisticated types of foreign and domestic ordnance and Improvised Explosive Devices necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission.

This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render-safe and dispose of sea mines and other underwater ordnance.

This program also provides for the research and development of Electronic Warfare (EW) systems, equipment, procedures, and tactical aids for all military services against the threat posed by Radio-Controlled Improvised Explosive Devices (RCIEDs) and to prevent initiation of RCIEDs across the spectrum of Joint military operations. Utilize Joint requirements to provide a system of systems approach for a suite of equipment for mounted, dismounted, and fixed site operations; provide a Joint Counter RCIED EW (CREW) development of equipment, procedures, and tactical aids to make rapid improvements to performance, supportability and affordability, while maintaining pace with evolving global threat.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	46.911	53.367	44.474	-	44.474
Current President's Budget	48.686	83.067	43.148	13.900	57.048
Total Adjustments	1.775	29.700	-1.326	13.900	12.574
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.259	0.000			
• SBIR/STTR Transfer	-1.463	0.000			
• Program Adjustments	3.500	29.700	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	-1.326	13.900	12.574
• Congressional General Reductions Adjustments	-0.021	-	-	-	-
• Congressional Directed Reductions Adjustments	-1.500	-	-	-	-

Change Summary Explanation

Other Rate/Misc Adjustments: -\$1.326M.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603654N / JT Service Explosive Ordn Dev				0377 / JT Service Expl Ord Disp System			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0377: JT Service Expl Ord Disp System	365.499	13.540	13.572	7.839	-	7.839	18.192	6.034	6.683	11.377	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) Project (0377) provides funding for the detailed design, development, risk mitigation, issue resolution, integrations, test, test equipment, simulations and post-deployment improvements of specialized equipment, tools and assessment of accessories that expand range of military operations required to support DoD's only Joint Explosive Ordnance Disposal (EOD) programs.

EOD exclusively executes world-wide missions for detection/location, identification, render-safe, recovery, field and laboratory evaluation, and disposal of hazards and unexploded ordnance (UXO) that is a threat to military operations, installations, personnel, or material. UXO includes foreign and domestic, both conventional and non-conventional, including Improvised Explosive Devices (IEDs); hazards includes fuels weapons and weapons of mass destruction devices using radiological and biological means with or without explosives.

The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 3 June 2011, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. EOD programs are designed to reduce the EOD operator's exposure to explosive hazards or limit the risk to an acceptable level. EOD operations range from hand entry of explosive devices by EOD technicians to robotic actions and sensing capabilities that provide a safe distance of the explosive hazard at a greatly reduced cost to trained and experienced EOD operators.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS)					1.915	2.296	1.595	0.000	1.595
					Articles:	-	-	-	-
FY 2018 Plans: Continue AEODRS Inc 2 Joint Service EOD Common Control Platform integration, testing and production readiness. Development of Software Mobile application for EOD digital handheld devices for Joint Service Decision Support System (DSS) tools.									
FY 2019 Base Plans: Continue the EOD Warfighter defined improvements to the JEOD DSS Portal and Mobile Field Kit; applications; and further the integration of AN/GSQ-275 Radiographic Imaging System EOD, Advanced EOD Robotics									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
1319 / 4	PE 0603654N / JT Service Explosive Ordn Dev	0377 / JT Service Expl Ord Disp System			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
System (AEODRS), and other Joint Service EOD tools and equipment into the JEOD DSS Node 4 Common Controller.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort.					
Title: EOD ROBOTICS	Articles:	10.345	9.956	6.244	0.000
FY 2018 Plans: Continue development and test AEODRS Increment 2 Prime System Integrator Production Representative/First Articles Systems and prepare for production and manufacturing. Prepare for AEODRS Increment 3 (Base and Infrastructure) Program Initiation (Milestone B).		-	-	-	-
FY 2019 Base Plans: Conduct Government Production First Article acceptance test and preparation for Full Rate Production. Milestone Authority approval for Advanced EOD Robotics System (AEODRS) Inc 3, Milestone B. Complete technical re-fresh plans and engineering improvements plans for AEODRS increments.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort for continued development for Advanced EOD Robotics Systems Inc 2 and Advanced EOD Robotics Systems Inc 3 Offset.					
Title: TCM AN/PLT-XXX SYSTEMS	Articles:	1.280	1.320	0.000	0.000
FY 2018 Plans: Develop and upgrade threat loadset to remain current with continually changing threats.		-	-	-	-
FY 2019 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev					Project (Number/Name) 0377 / JT Service Expl Ord Disp System						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)															
							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Technical adjustment to Project 3177.															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: Technical Adjustment to Project 3177.															
Accomplishments/Planned Programs Subtotals							13.540	13.572	7.839	0.000	7.839				
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
• OPN/5509(a): EOD Equipment (VN075)	6.355	0.000	8.506	-	8.506		9.237	5.579	5,771.000	6.039	0.000	5,828.599			
Remarks															
D. Acquisition Strategy															
Joint Service acquisition strategies utilize an evolutionary open architecture and modular strategy for rapid acquisition of mature technology for the user. The evolutionary approach delivers baseline capability and subsequent increments, recognizing up front the need for future capability improvements. Each increment is a militarily useful and supportable operational capability that can be developed, produced, deployed, and sustained. The evolutionary open architecture and modular strategy allows for rapid block upgrades, pre-planned product improvements, new accessories that expand range of military operations that provide a significant increase in operational capability and improvements at the modular level and encourages competition and second sources to lower life cycle costs. Once deployed, the upgrades can be developed, tested and deployed at the modular level and new capabilities can be delivered without having to return the entire tool (e.g. robot) to a depot for system level conversion. System Test bed and modeling and simulation can verify module system level compliance in a laboratory, greatly reducing the cost to conduct expensive range testing. Analysis of Alternatives (AOA) studies are conducted prior to the initiation of new subprojects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the subprojects' life-cycle. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.															
E. Performance Metrics															
Processed 40 functional & 113 Maintenance Joint Service EOD Decision Support System (DSS) change requests resulting of 4,264 sets of Mobile Field Kit Software, 4,264 Unclassified and Secret AEODPS. Completed migration to Microsoft Windows 10 Operating System on Joint EOD DSS Node 4 Common Controller and completed the unclassified configuration of the JEOD DSS N4 CC.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 0377 / JT Service Expl Ord Disp System							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWCIHEODTD : Indian Head, MD	185.244	8.165	Oct 2016	2.947	Nov 2017	1.000	Nov 2018	-		1.000	Continuing	Continuing	Continuing
Primary Hardware Development	C/FFP	Northrop Grumman : Herndon, VA	9.044	3.500	Dec 2016	0.000		0.000	Nov 2018	-		0.000	Continuing	Continuing	Continuing
Primary Hardware Development	C/FFP	TBD : TBD	0.000	0.000	Jun 2017	8.500	Nov 2017	4.847	Nov 2018	-		4.847	0.000	13.347	-
ILS	WR	EODTD : Indian Head, MD	48.590	0.500	Oct 2016	0.400	Nov 2017	0.300	Nov 2018	-		0.300	Continuing	Continuing	Continuing
Subtotal			242.878	12.165		11.847		6.147		-		6.147	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	HARRIS : Herndon, VA	8.008	0.300	Nov 2016	0.375	Nov 2017	0.367	Nov 2018	-		0.367	Continuing	Continuing	Continuing
Subtotal			8.008	0.300		0.375		0.367		-		0.367	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	EODTD : Indian Head, MD	76.469	0.850	Nov 2016	0.900	Nov 2017	0.900	Dec 2018	-		0.900	Continuing	Continuing	Continuing
Operation Test & Evaluation	WR	EODTD : Indian Head, MD	11.483	0.025	Nov 2016	0.025	Nov 2017	0.025	Nov 2018	-		0.025	Continuing	Continuing	Continuing
Subtotal			87.952	0.875		0.925		0.925		-		0.925	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 0377 / JT Service Expl Ord Disp System							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	EODTD : Indian Head, MD	10.209	0.200	Oct 2016	0.425	Nov 2017	0.400	Nov 2018	-		0.400	Continuing	Continuing	Continuing
Miscellaneous	WR	EODTD : Indian Head, MD	16.452	0.000		0.000		0.000	Nov 2018	-		0.000	Continuing	Continuing	Continuing
Subtotal			26.661	0.200		0.425		0.400		-		0.400	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			365.499	13.540		13.572		7.839		-		7.839	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

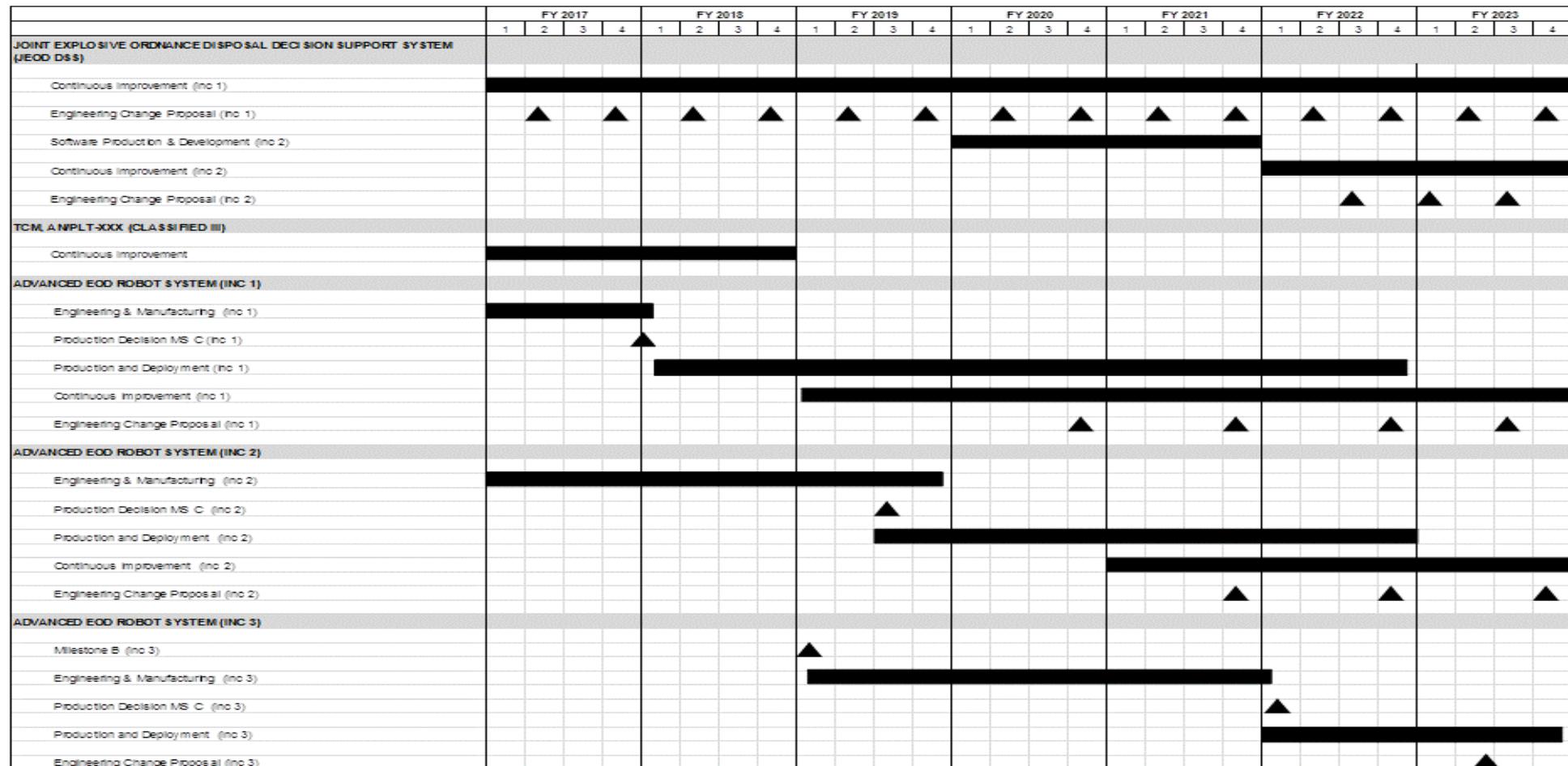
1319 / 4

R-1 Program Element (Number/Name)

PE 0603654N / JT Service Explosive Ordn Dev

Project (Number/Name)

0377 / JT Service Expl Ord Disp System



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 0377 / JT Service Expl Ord Disp System

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0377				
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Continuous Improvement (Inc 1)	1	2017	4	2023
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 1 (Inc 1)	2	2017	2	2017
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 2 (Inc 1)	4	2017	4	2017
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 3 (Inc 1)	2	2018	2	2018
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 4 (Inc 1)	4	2018	4	2018
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 5 (Inc 1)	2	2019	2	2019
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 6 (Inc 1)	4	2019	4	2019
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 7 (Inc 1)	2	2020	2	2020
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 8 (Inc 1)	4	2020	4	2020
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 9 (Inc 1)	2	2021	2	2021
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 10 (Inc 1)	4	2021	4	2021
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 11 (Inc 1)	2	2022	2	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 0377 / JT Service Expl Ord Disp System		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 12 (Inc 1)	4	2022	4	2022
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 13 (Inc 1)	2	2023	2	2023
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 14 (Inc 1)	4	2023	4	2023
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Software Production & Development (Inc 2)	1	2020	4	2021
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Continuous Improvement (Inc 2)	1	2022	4	2023
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 1 (Inc 2)	3	2022	3	2022
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 2 (Inc 2)	1	2023	1	2023
JOINT EXPLOSIVE ORDNANCE DISPOSAL DECISION SUPPORT SYSTEM (JEOD DSS): Engineering Change Proposal 3 (Inc 2)	3	2023	3	2023
TCM, AN/PLT-XXX (CLASSIFIED III): Continuous Improvement	1	2017	4	2018
ADVANCED EOD ROBOT SYSTEM (INC 1): Engineering & Manufacturing (Inc 1)	1	2017	1	2018
ADVANCED EOD ROBOT SYSTEM (INC 1): Production Decision MS C (Inc 1)	4	2017	1	2018
ADVANCED EOD ROBOT SYSTEM (INC 1): Production and Deployment (Inc 1)	1	2018	4	2022
ADVANCED EOD ROBOT SYSTEM (INC 1): Continuous Improvement (Inc 1)	1	2019	4	2023
ADVANCED EOD ROBOT SYSTEM (INC 1): Engineering Change Proposal (Inc 1) 1	4	2020	4	2020
ADVANCED EOD ROBOT SYSTEM (INC 1): Engineering Change Proposal (Inc 1) 2	4	2021	4	2021
ADVANCED EOD ROBOT SYSTEM (INC 1): Engineering Change Proposal (Inc 1) 3	4	2022	4	2022
ADVANCED EOD ROBOT SYSTEM (INC 1): Engineering Change Proposal (Inc 1) 4	4	2023	4	2023
ADVANCED EOD ROBOT SYSTEM (INC 2): Engineering & Manufacturing (Inc 2)	1	2017	4	2019
ADVANCED EOD ROBOT SYSTEM (INC 2): Production Decision MS C (Inc 2)	3	2019	3	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 0377 / JT Service Expl Ord Disp System		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	3	2019	4	2022
	1	2021	4	2023
	4	2021	4	2021
	4	2022	4	2022
	4	2023	4	2023
	1	2019	1	2019
	1	2019	1	2022
	1	2022	1	2022
	1	2022	4	2023
	2	2023	3	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 1317 / EOD Diving System				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
1317: EOD Diving System	107.448	6.467	5.113	4.357	-	4.357	4.527	4.621	3.977	4.816	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

These resources support the development of equipment for the Navy's only comprehensive expeditionary detect to engage MCM capability, i.e. Ex MCM Company. Specifically, it provides for development of Diver Safety/Life Support Equipment, Advanced Diver Integrated Sensors and Advanced Firing Systems to support Navy Explosive Ordnance Disposal (EOD) underwater operations and Expeditionary MCM Company establishment by US Fleet Forces Command. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD divers to safely approach, render-safe, recover, exploit, and dispose of underwater explosive threats to include sea mines, limpet mines, underwater improvised explosive devices, and unexploded ordnance. Note: The schedules have been re-formatted to allow for better communication of program execution.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: DIVER SAFETY & LIFE SUPPORT SYSTEMS Articles: Description: Diver Safety & Life Support Systems: Develop diver safety tools to include more capable life support systems for EOD, and Mobile Diving & Salvage Units (MDSU) operations. Specific tools include but are not limited to Underwater Breathing Apparatus (UBA), specialized dive masks, heads-up displays, emergency life support systems and the ability to train divers and to evaluate Mine Countermeasures (MCM)/Explosive Ordnance Disposal (EOD) tools, tactics and procedures with regard to influence cleanliness against sea mines both at home and in controlled threat areas prior to commencing EOD operations.	4.281	2.950	2.000	0.000	2.000
FY 2018 Plans: The MMUBA will receive an acquisition designation and achieve MS B in FY 2018. Development contract will be awarded to deliver EDMs for test and evaluation. Complete fielding of METRES improvements.	-	-	-	-	-
FY 2019 Base Plans: FY19 efforts will focus on continuation of the MMUBA acquisition program (MOTS UBA, MMUBA, MK 16 PIP) and diver safety life support enhancements identified through continued engagement with Fleet EOD diving and expeditionary salvage forces.					
FY 2019 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 1317 / EOD Diving System				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort based on FY18 completion of assessment and evaluation of Commercial Off-the-Shelf (COTS) diving rigs and FY18 execution of assessment, evaluation and selection of Multi Mission Underwater Breathing Apparatus.						
Title: ADVANCED DIVER INTEGRATED SENSORS	Articles:	1.897	1.920	1.958	0.000	1.958
Description: Develop Advanced Diver Integrated Sensors equipment to enhance EOD and MDSU ability to detect, access, neutralize and gather intelligence on underwater targets of interest. Requirements include STRIDENT and improvements to the MK 15 Underwater Imaging System (UIS).		-	-	-	-	-
FY 2018 Plans: In FY18, the ACAT designation and Milestone B will be realized and STRIDENT Engineering Development Model (EDM) contract will be awarded. EDM development and fabrication will commence with testing by the manufacturer continuing through of FY 2018. Continue to enhance the MK 15 Mod UIS diver-based search capability through fleet-based product improvements.						
FY 2019 Base Plans: FY19 efforts will focus on completing the initial enhancements needed to continue MK 15 UIS capability until STRIDENT capability is fielded. Continue development, testing, and evaluation of STRIDENT EDMs.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.						
Title: ADVANCED FIRING SYSTEM	Articles:	0.289	0.243	0.399	0.000	0.399
Description: Develops product improvements to existing systems for below and above water neutralization of underwater threats to support EOD and MDSU operations.		-	-	-	-	-
FY 2018 Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev			Project (Number/Name) 1317 / EOD Diving System					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
Continue development and testing of product improvements to AFD receiver subsystems.											
FY 2019 Base Plans: FY19 efforts will focus on continuing development, testing, and evaluation of product improvements to the Mk 12 AFS receiver subsystems.											
FY 2019 OCO Plans: N/A											
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.											
Accomplishments/Planned Programs Subtotals					6.467	5.113	4.357	0.000	4.357		
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/0977a: Underwater EOD Program (Cost Code UQ034)	1.730	1.100	1.125	-	1.125	1.350	2.095	6.622	6.754	0.000	47.521
• OPN/0977b: UW EOD (UQ036)	0.411	0.475	0.660	-	0.660	0.660	0.660	4.050	4.131	0.000	14.585
Remarks											
D. Acquisition Strategy											
Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new sub-projects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the sub-projects life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), non-developmental item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.											
E. Performance Metrics											
Research and Develop technologies for the design of Diver Safety Systems, Advanced Diver Integrated Sensors and Advanced Underwater Firing Systems used to render safe, recover, exploit, and dispose of sea limpet mines and unexploded ordnance.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 1317 / EOD Diving System							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	Multiple Activities : Not Specified	42.103	2.047	Oct 2016	0.950	Oct 2017	0.850	Nov 2018	-		0.850	Continuing	Continuing	Continuing
Software Development	WR	Multiple Activities : Not Specified	5.094	1.439	Oct 2016	0.208	Oct 2017	0.170	Nov 2018	-		0.170	Continuing	Continuing	Continuing
Systems Engineering	WR	Multiple Activities : Not Specified	8.228	0.000		0.000		0.000		-		0.000	0.000	8.228	-
ILS	WR	Multiple Activities : Not Specified	11.916	0.000		0.000		0.000		-		0.000	0.000	11.916	-
Systems Engineering	WR	NSWC : Panama City	2.228	0.617	Oct 2016	0.879	Oct 2017	0.702	Nov 2018	-		0.702	Continuing	Continuing	Continuing
Systems Engineering	WR	SPAWAR : San Diego	3.634	0.376	Oct 2016	1.189	Oct 2017	0.970	Nov 2018	-		0.970	Continuing	Continuing	Continuing
Subtotal			73.203	4.479		3.226		2.692		-		2.692	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support1	C/CPFF	HARRIS : Herndon VA	3.537	0.000		0.000		0.000		-		0.000	0.000	3.537	-
Program Management Support2	C/CPFF	HARRIS : Herndon VA	3.871	0.530	Oct 2016	0.510	Nov 2017	0.450	Nov 2018	-		0.450	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Configuration Management	WR	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Technical Data	WR	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
GFE	WR	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Award Fees	WR	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 1317 / EOD Diving System								
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
		Subtotal	7.408	0.530		0.510		0.450		-		0.450	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Development Test & Evaluation	WR	Multiple Activities : Not Specified	8.180	0.719	Oct 2016	0.663	Oct 2017	0.585	Nov 2018	-		0.585	Continuing	Continuing	Continuing	
Operational Test & Evaluation	WR	Multiple Activities : Not Specified	1.560	0.000		0.000		0.000		-		0.000	0.000	1.560	-	
	Subtotal	9.740	0.719		0.663		0.585		-		0.585	Continuing	Continuing	N/A		
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	WR	EODTECHDIV : IH MD	10.141	0.717	Oct 2016	0.693	Nov 2017	0.611	Nov 2018	-		0.611	0.000	12.162	-	
Miscellaneous	WR	NSWC, Activities : Not Specified	6.943	0.022	Oct 2016	0.021	Nov 2017	0.019	Nov 2018	-		0.019	0.000	7.005	-	
Acquisition Workforce Fund	Various	Various : Various	0.013	0.000		0.000		0.000		-		0.000	0.000	0.013	-	
	Subtotal	17.097	0.739		0.714		0.630		-		0.630	0.000	19.180	N/A		
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				107.448	6.467		5.113		4.357		-		4.357	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

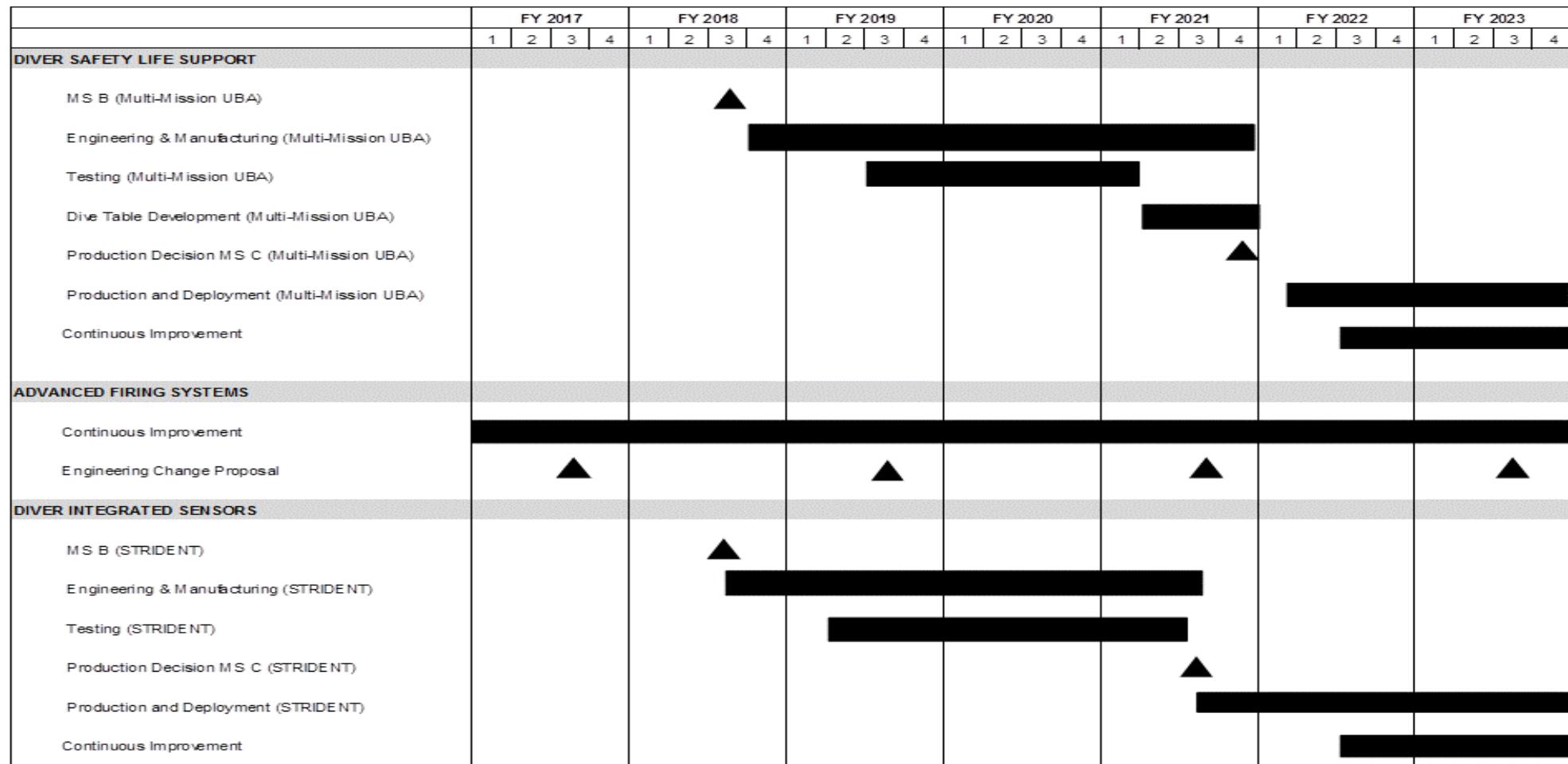
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603654N / *JT Service Explosive Ordnance Dev*

Project (Number/Name)
1317 / EOD Diving System



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 1317 / EOD Diving System		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Year				
Proj 1317				
TITLE: DIVER SAFETY LIFE SUPPORT		1	2017	4
---MS B (Multi-Mission UBA)		3	2018	3
---Engineering & Manufacturing (Multi-Mission UBA)		4	2018	4
---Testing (Multi-Mission UBA)		3	2019	1
---Dive Table Development (Multi-Mission UBA)		2	2021	4
---Production Decision MS C (Multi-Mission UBA)		4	2021	4
---Production and Deployment (Multi-Mission UBA)		2	2022	4
---Continuous Improvement		3	2022	4
TITLE: ADVANCED FIRING SYSTEMS		1	2017	4
---Continuous Improvement.		1	2017	4
---Engineering Change Proposal 1		3	2017	3
---Engineering Change Proposal 2		3	2019	3
---Engineering Change Proposal 3		3	2021	3
---Engineering Change Proposal 4		3	2023	3
TITLE: DIVER INTEGRATED SENSORS		1	2017	4
---MS B (STRIDENT)		3	2018	3
---Engineering & Manufacturing (STRIDENT)		3	2018	3
---Testing (STRIDENT)		2	2019	2
---Production Decision MS C (STRIDENT)		3	2021	3
---Production and Deployment (STRIDENT)		4	2021	4
---Continuous Improvement-		3	2022	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603654N / JT Service Explosive Ordn Dev				3177 / Joint Counter Radio-Controlled IED Elec Warfare				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3177: Joint Counter Radio-Controlled IED Elec Warfare	0.000	13.194	45.264	14.016	13.900	27.916	11.414	11.731	9.755	12.155	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Provides for the research and development of Electronic Warfare (EW) systems, equipment, procedures, and tactical aids for all military services against the threat posed by Radio-Controlled Improvised Explosive Devices (RCIEDs) and to prevent initiation of RCIEDs across the spectrum of Joint military operations. Utilize Joint requirements to provide a system of systems approach for a suite of equipment for mounted, dismounted, and fixed site operations; provide a Joint Counter RCIED EW (JCREW) development of equipment, procedures, and tactical aids to make rapid improvements to performance, supportability and affordability, while maintaining pace with evolving global threat.

Also provides for the rapid development and testing of JCREW Counter-Unmanned Aerial System (C-UAS) for Joint Urgent Operational Need Statement (JUON) CC-0558. This includes the modification of JCREW software, threat loads, and advanced techniques to provide an Increment I C-UAS capability, integration into JCREW dismounted systems delivered off the LRIP contract, lab verification, and open air testing. Due to rapidly evolving threats team will develop and support additional software drops throughout year.

The JCREW system, Increment 1 Block 1 (I1B1) is the next generation of counter RCIED systems. This family of systems includes fixed site, mounted and dismounted units, which provide countermeasures against the global RCIED threat. Key system design features include significant performance increases over current legacy systems, a modular open architecture system to address current and future advanced threats, robust information assurance and security, and is net-capable for improved Communications and Control (C2). JCREW I1B1 supports global deployment and sustainment for all combatant commands providing increased protection to Warfighter against the evolving worldwide RCIED threats.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Joint Counter Radio-Controlled IED Elec Warfare	13.194	45.264	13.070	13.900	26.970
Articles:	-	-	-	-	-

Description: Supports the design, integration and test of Tech Insertion hardware, software, and advanced techniques into JCREW systems. Tech Insertion candidates include ONR sponsored technologies ready for transition to JCREW, and techniques, hardware and software performance improvements developed by Navy laboratories, FFRDCs, UARCs, and the JCREW Prime contractor. Analysis of Alternatives will be conducted to evaluate and select Tech Insertion candidates based on technical maturity, cost, and performance. Hardware and software updates will be designed, tested, and implemented into JCREW through Engineering Change

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 3177 / Joint Counter Radio-Controlled IED Elec Warfare				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Proposals. Also provides for the rapid development and testing of JCREW Counter-Unmanned Aerial System (C-UAS) for Joint Urgent Operational Need(JUON) CC-0558.						
<p>FY 2018 Plans: Complete Analysis of Alternatives for Tech Insertion 2. Begin product development of Tech Insertion 2. Continue development and testing of threat loads and software and hardware Engineering Change Proposals (ECPs) in support of C-UAS JUON CC-0558.</p> <p>FY 2019 Base Plans: Perform and complete Tech Refresh development, implementation and testing for Tech Insertion 2. Begin Analysis of Alternatives for Tech Insertion 3. Continue development and testing of threat loads, software, and hardware and processing the associated Engineering Change Proposals (ECPs) in support of support of C-UAS JUON CC-0558.</p> <p>FY 2019 OCO Plans: FY2019 OCO \$12.9M funding supports Navy assigned requirement to provide C-UAS capability in response to JUON CC-0558. Thirty C-UAS systems have been fielded to date to provide a rapid response initial capability, with additional systems planned per the JUON. Enhanced performance will be required to maintain capability against the evolving UAS threat. These enhancements will require development and testing of hardware and software/firmware upgrades, and integration of C-UAS capability on various platforms, to include small combatant craft, ships, and fixed site infrastructure.</p> <p>Additional \$1M OCO funds provide HEMLOCK project with required software upgrades to enable enhanced cyber and electronics forensics and exploitation of RCIED threats. Further information on Hemlock available at a higher classification.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort primarily due to completion of major efforts in FY18 supporting Joint Urgent Operational Need (CC-0558) for Counter Unmanned Aerial Systems (CUAS).</p>						
Title: EOD CREW FY 2018 Plans:		Articles: 0.000	Articles: 0.000	Articles: 0.946	Articles: 0.000	Articles: 0.946

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018							
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			Project (Number/Name)									
1319 / 4		PE 0603654N / JT Service Explosive Ordn Dev			3177 / Joint Counter Radio-Controlled IED Elec Warfare									
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
N/A														
FY 2019 Base Plans: Develop AN/PLT-5 load sets for fielded EOD TCM systems to remain current with continually changing threats, both CONUS and OCONUS. Develop AN/PLT-4 replacement.														
FY 2019 OCO Plans: N/A														
FY 2018 to FY 2019 Increase/Decrease Statement: Technical Adjustment from Project Unit 0377.														
Accomplishments/Planned Programs Subtotals							13.194	45.264	14.016	13.900	27.916			
C. Other Program Funding Summary (\$ in Millions)														
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
• OPN/5509(b): Explosive Ordnance Disposal Equip	81.208	63.462	0.836	30.900	31.736	0.868	0.877	0.894	0.912	0.000	182.886			
Remarks														
PE 0604653N/JT Cntr Radio Controlled IED Elec War (JCREW) consolidated into PE 0603654N/JT Service Explosive Ordn Dev FY17 and out.														
D. Acquisition Strategy														
FRP Production Line Start Up and Ramp Up and FRP Organic Depot Line Startup and Ramp Up in FY 2017. Spares support and OEM Depot will be utilized during LRIP phase. Establishment of Organic Depot capability during LRIP phase in support of FRP Decision Review with Weapons System Support Center Mechanicsburg as Primary Inventory Control Activity (PICA). Full Rate Production contract will be full and open competition using LRIP final Tech Data Package (TDP) with unlimited data rights. Tech Insertion will help to maintain JCREW performance against evolving global RCIED threats.														
E. Performance Metrics														
LRIP contract awarded September 2015. Deliveries will support IOC. Analysis of Alternatives for Tech Insertion 1 in September 2015. Full Rate Production contract award planned for August 2017. Tech Insertion 2 development commences in FY18 based on outcome of Analysis of Alternatives.														

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 3177 / Joint Counter Radio-Controlled IED Elec Warfare							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Various	TBD : TBD	0.000	1.929	Nov 2016	8.615	Jan 2018	3.105	Jan 2019	2.526	Jan 2019	5.631	Continuing	Continuing	Continuing
Systems Engineering	Various	TBD : TBD	0.000	3.464	Nov 2016	3.452	Jan 2018	1.350	Jan 2019	1.260	Jan 2019	2.610	Continuing	Continuing	Continuing
Software Development	Various	TBD : TBD	0.000	0.964	Nov 2016	6.495	Jan 2018	1.705	Jan 2019	1.067	Jan 2019	2.772	Continuing	Continuing	Continuing
System Integration	Various	TBD : TBD	0.000	0.964	Nov 2016	1.952	Jan 2018	1.300	Jan 2019	1.152	Jan 2019	2.452	Continuing	Continuing	Continuing
		Subtotal	0.000	7.321		20.514		7.460		6.005		13.465	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Loadset Development	FFRDC	JHU/APL, MITRE: Laurel, MD	0.000	0.592	Nov 2016	4.504	Dec 2017	0.810	Nov 2018	1.048	Nov 2018	1.858	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC: Various	0.000	2.242	Nov 2016	7.179	Nov 2017	2.986	Nov 2018	3.900	Nov 2018	6.886	Continuing	Continuing	Continuing
Program Management Support	WR	IHEODTD: Indian Head, MD	0.000	0.331	Nov 2016	1.241	Nov 2017	0.270	Nov 2018	0.375	Nov 2018	0.645	Continuing	Continuing	Continuing
		Subtotal	0.000	3.165		12.924		4.066		5.323		9.389	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	WR	NSWC : Various	0.000	1.208	Nov 2016	6.658	Nov 2017	0.896	Nov 2018	1.031	Nov 2018	1.927	Continuing	Continuing	Continuing
Test & Evaluation	MIPR	YPG : Yuma, Arizona	0.000	0.850	Nov 2016	3.398	Nov 2017	1.365	Nov 2018	1.241	Nov 2018	2.606	Continuing	Continuing	Continuing
		Subtotal	0.000	2.058		10.056		2.261		2.272		4.533	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev			
												Project (Number/Name) 3177 / Joint Counter Radio-Controlled IED Elec Warfare			
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	Cydecor : Various	0.000	0.224	Dec 2016	0.890	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Miscellaneous	WR	NSWC : Various	0.000	0.426	Dec 2016	0.880	Dec 2017	0.229	Nov 2018	0.300	Dec 2018	0.529	Continuing	Continuing	Continuing
Subtotal			0.000	0.650		1.770		0.229		0.300		0.529	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	13.194		45.264		14.016		13.900		27.916	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

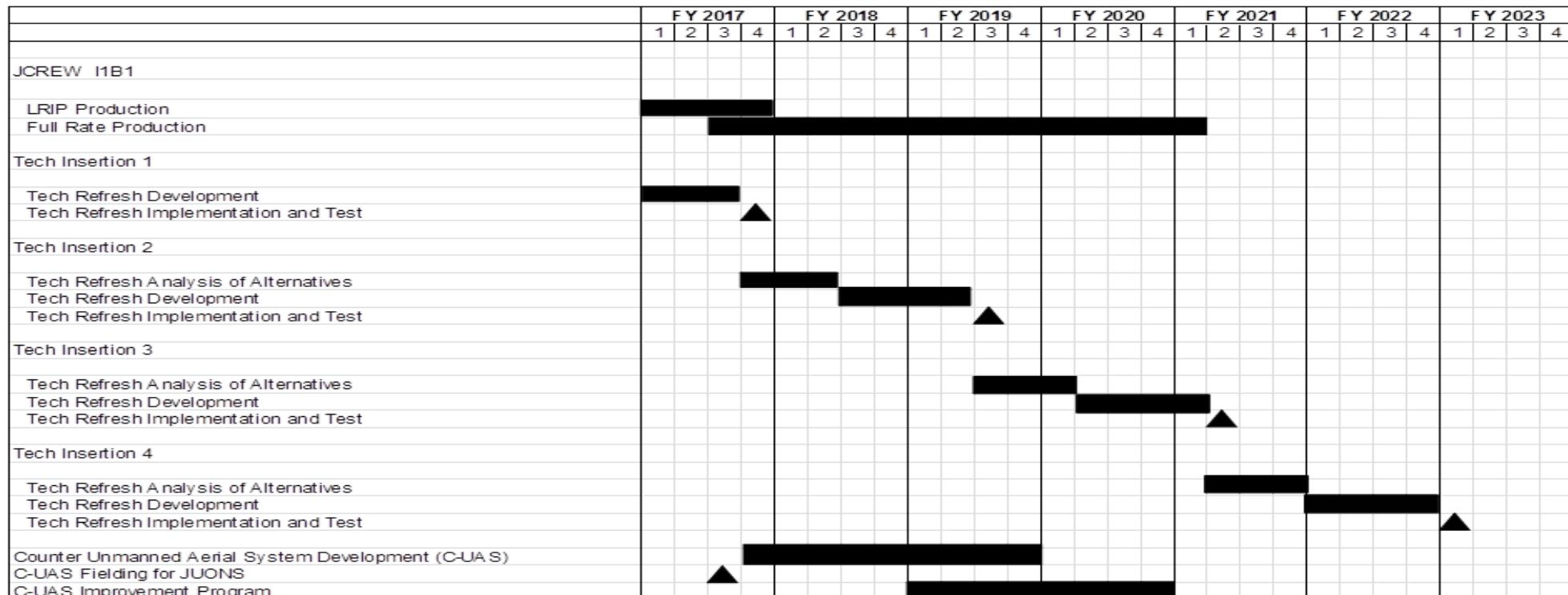
1319 / 4

R-1 Program Element (Number/Name)

PE 0603654N / JT Service Explosive Ordn
Dev

Project (Number/Name)

3177 I Joint Counter Radio-Controlled IED Elec Warfare



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603654N / JT Service Explosive Ordn
Dev

Project (Number/Name)

3177 | Joint Counter Radio-Controlled IED Elec Warfare

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 3177 / Joint Counter Radio-Controlled IED Elec Warfare		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Year				
Proj 3177				
JCREW I1B1: LRIP Production		1	2017	4
JCREW I1B1: Full Rate Production		3	2017	1
JCREW I1B1: TECH INSERTION 1		1	2017	4
JCREW I1B1: Tech Refresh Development (1)		1	2017	3
JCREW I1B1: Tech Refresh Implementation and Test (1)		4	2017	4
JCREW I1B1: TECH INSERTION 2		4	2017	3
JCREW I1B1: Tech Refresh Analysis of Alternatives (2)		4	2017	2
JCREW I1B1: Tech Refresh Development (2)		3	2018	2
JCREW I1B1: Tech Refresh Implementation and Test (2)		3	2019	3
JCREW I1B1: TECH INSERTION 3		3	2019	2
JCREW I1B1: Tech Refresh Analysis of Alternatives (3)		3	2019	1
JCREW I1B1: Tech Refresh Development (3)		2	2020	1
JCREW I1B1: Tech Refresh Implementation and Test (3)		2	2021	2
JCREW I1B1: TECH INSERTION 4		2	2021	4
JCREW I1B1: Tech Refresh Analysis of Alternatives (4)		2	2021	4
JCREW I1B1: Tech Refresh Development (4)		1	2022	4
JCREW I1B1: Tech Refresh Implementation and Test (4)		1	2023	1
JCREW I1B1: Counter Unmanned Aerial System Development		3	2017	4
JCREW I1B1: C-UAS Fielding for JUONS		3	2017	3
JCREW I1B1: C-UAS Improvement Program		1	2019	4
EOD CREW: Continuous Improvement		1	2019	4
				2023

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 3177 / Joint Counter Radio-Controlled IED Elec Warfare		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
EOD CREW: AN/PLT 4 Replacement	1	2019	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603654N / JT Service Explosive Ordn Dev				4023 / VSW MCM/Force Protection UUV			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
4023: VSW MCM/Force Protection UUV	109.817	15.485	19.118	16.936	-	16.936	17.592	15.995	15.872	18.726	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding support the development of unmanned systems for the Navy's only fielded expeditionary unmanned underwater EOD and MCM capability. Specifically, it provides for development of affordable expeditionary, unmanned underwater systems to support Navy Expeditionary forces including Explosive Ordnance (EOD). Mobile Diving and Salvage Units, and Shallow Water (SW), Very Shallow Water (VSW) and Expeditionary Mine Countermeasures (ExMCM) mission operations. The equipment must be highly portable in order to support the Navy EOD technician to safely approach, render safe, recover, exploit and dispose of underwater explosive threats to include sea mines, limpet mines and unexploded ordnance. Provides support for the Navy's high priority missions of Maritime Homeland Defense, MCM, including clandestine reconnaissance and mine clearance in support of amphibious operations. Development of Expeditionary UUV systems to support localization render-safe and detailed intelligence gathering of UXO including Underwater Improvised Explosive Devices. This project supports CNO N957 MCM UUV Roadmap.

The increase in RDT&E resources from FY 2017 to FY 2018 provides the RDT&E resources needed to execute two formal MK 18 Family of Systems acquisition programs as well as three major engineering change proposals and the enhancement to the MK19 Family of Systems to provide an underwater threat interdiction capability. These efforts require prototype development and significant DT&E during FY 2018. FY 2018 program execution tempo reflects a significant increase in activity to support MK 18 UUV Increment II and EOD Response ROV capability development

FY 2018 will focus on completion of the development and testing of advanced sensors (SSAM and ATLAS) that will allow warfighters to detect, classify and localize high priority threats in meeting mine warfare missions. Also, resources will be used to expand deployability of the MK 18 Family of Systems aboard a higher number of shipboard platforms and also to deploy the family of systems from additional small boats other than the 11m RHIB. The Increment 1 MK 18 Mod 2 upgrade will allow implementation of Automated Target Recognition (ATR), advanced autonomy architecture and enhanced electro-optic sensor performance. Increment II will focus on improving MCM performance and reducing the tactical timeline through fielding a Reacquire, Identify and Mark capability for the MK 18 Mod 2 system. Concurrently with these efforts, the MK 18 Mod 1 is undergoing a configuration change that will provide a higher area coverage rate, inclusion of vehicle autonomy, and Automated Target Recognition. Additional efforts will execute the open competition process necessary to acquire and verify an EOD Response ROV capability focusing on user effectiveness and operational suitability.

These efforts will significantly improve the capabilities of the projected inventory of 48 MK 18 Mod 2 vehicles and 75 MK 18 Mod 1 vehicles for fleet expeditionary forces. Currently, the MK 18 Family of Systems are being employed in multiple theater of operations (5th, 6th and 7th Fleet) and have been continuously employed in multiple CONUS based port survey and maritime homeland defense as well.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603654N / JT Service Explosive Ordn Dev	4023 / VSW MCM/Force Protection UUV				
These resources also support the FY 2018 enhancement of the MK 19 Family of Systems, (i.e. a ROV based ship's hull search capability) as well as a MK 19 variant (i.e. a ROV based target interdiction capability) based on the previously conducted EUNS AoA. In FY 2018, the next generation (i.e. modified-off-the-shelf (MOTS) ROV) is being developed to decrease risk when reacquiring/investigating a potential threat (i.e. sea mine or underwater Improvised Explosive Device).						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: VSW MCM/Force Protection UUV	Articles:	15.485	19.118	16.936	0.000	16.936
<p>Description: This program supports development, testing and Fleet approval for evolving generations of affordable, expeditionary Unmanned Underwater Vehicles (UUV), support equipment, and Common Operator Interface Navy (COIN) systems to address validated requirements in support of Expeditionary SW and VSW UMCN mission areas. Mission areas include: open and confined areas, hulls, piers and pilings to search, classify, map, re-acquire, identify, and neutralize sea and limpet mines and underwater improvised explosive devices.</p> <p>FY 2018 Plans: Continue testing evaluation, fielding and installation of MK 18 MOD 1 and MOD 2 UUV Systems to meet US Fleet Forces Command inventory objectives in support of the Expeditionary MCM Company capability establishment. The MK 18 Family of Systems will enter the Production/Deployment phase following a successful Milestone C decision for the MK 18 Mod 2 Increment 1 project. FY 18 efforts will continue in preparation for a production decision for the advanced sensors (i.e. ATLAS and SSAM); and the MK 18 Mod 2 Increment 2 project will enter the Engineering Development and Manufacturing phase. The MK 19 Engineering Change Proposal process will field a MOTS ROV prototype for DT&E, in FY 2018. FY18 efforts will also address development of synthetic training for the MK 18 FoS, enhanced C2 capability with mobile gateway buoy and HFGW and assessing system vulnerabilities thru penetration testing on the MK 18 FoS.</p> <p>FY 2019 Base Plans: FY19 efforts will focus on continued development and testing of MK 18 Mod 2 Increment II and MOTS ROV projects. Additionally, efforts to complete preliminary engineering change proposal actions necessary to transition technologies developed and demonstrated in the rapid innovation fund (RIF) and small business innovative research (SBIR) initiatives to initiate transition as incremental capability improvements to baseline MK 18 and MK 19 systems will continue. These capability improvements will form the developmental baseline for the Next Generation UUV system.</p> <p>FY 2019 OCO Plans:</p>		-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 4023 / VSW MCM/Force Protection UUV			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
N/A											
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile primarily related to FY18 completion of MK 18 Mod 2 UUV Increment I development and completion of prototype development and operational effectiveness and suitability testing of ATLAS advanced sensor.											
Accomplishments/Planned Programs Subtotals						15.485	19.118	16.936	0.000	16.936	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/0977(a): Underwater EOD Program (Cost Code UQ034)	22.110	34.124	27.620	-	27.620	20.970	21.235	14.339	14.316	0.000	274.402
• OPN/0977(b): Expeditionary Mine Countermeasures (ExMCM) (Cost Code UQ038)	0.000	15.412	33.932	6.700	40.632	1.150	0.591	0.603	0.615	0.000	59.003
• OPN/0977 (c): Naval Special Warfare (NSW) (Cost Code UQ039)	0.000	4.950	3.370	2.500	5.870	1.692	1.692	1.692	1.725	0.000	17.621
Remarks											
D. Acquisition Strategy Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new sub-projects. The AOA addresses and emphasizes acquisitions strategies of the most cost effective solution over the sub-projects' life -cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modifications), non-developmental item (including modifications), and lastly, developmental programs. Contracting for RDT&E, if required is always competitive and when feasible, production options are included. This ongoing program capitalizes on a User Operational Evaluation System (UOES) effort involving Fleet operators engaged in tactical experimentation with prototype UUVs prior to fielding baseline systems and capability improvement package increments. These UUV operators also participate in detailed requirements analyses and definition. Operational capabilities with UUV have been realized at designated operational units, with a competitive acquisition strategy. The addition of enhanced capabilities through an evolutionary acquisition approach to the UUV toolbox is programmed for delivery in accordance with approved CNO requirements and ONR TTAs. Further improvements to the toolbox to add basic mine and underwater explosive threats neutralization capabilities will be pursued.											

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 4023 / VSW MCM/Force Protection UUV
E. Performance Metrics Research and Develop technologies for the design of Expeditionary Unmanned Underwater Systems to provide enhanced fleet capabilities to locate, classify, identify, assess, neutralize and conduct post-neutralization battle damage assessment/verification of mines and unexploded ordnance in support of ExMCM and EOD Forces.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 4023 / VSW MCM/Force Protection UUV							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	Multiple Activities : Not Specified	19.646	2.976	Oct 2016	4.240	Oct 2017	3.588	Nov 2018	-		3.588	0.000	30.450	-
Systems Engineering	WR	NSWC Activities : Not Specified	13.398	2.780	Oct 2016	3.478	Oct 2017	2.613	Nov 2018	-		2.613	0.000	22.269	-
Primary Hardware Development	WR	NSWC IH : IH, MD	16.238	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC, Activities : Not Specified	21.659	2.686	Oct 2016	3.152	Oct 2017	2.761	Nov 2018	-		2.761	Continuing	Continuing	Continuing
Subtotal		70.941	8.442		10.870		8.962		-			8.962	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Support	C/CPFF	HARRIS : Herndon, VA	5.676	0.586	Oct 2016	0.572	Nov 2017	0.583	Nov 2018	-		0.583	Continuing	Continuing	Continuing
Subtotal		5.676	0.586		0.572		0.583		-			0.583	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Activities : Not Specified	13.452	3.519	Oct 2016	3.844	Oct 2017	3.681	Nov 2018	-		3.681	0.000	24.496	-
Operational Test & Evaluation	WR	NSWC Activities : Not Specified	2.957	1.354	Oct 2016	1.785	Oct 2017	1.763	Nov 2018	-		1.763	0.000	7.859	-
Developmental Test & Evaluation	WR	NSWC Activities : Not Specified	8.994	1.151	Oct 2016	1.284	Oct 2017	1.269	Nov 2018	-		1.269	Continuing	Continuing	Continuing
Operational Test & Evaluation	WR	NSWC IH : IH, MD	1.424	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal		26.827	6.024		6.913		6.713		-			6.713	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev				Project (Number/Name) 4023 / VSW MCM/Force Protection UUV							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	EODTECHDIV : IH, MD	4.052	0.433	Oct 2016	0.511	Nov 2017	0.520	Nov 2018	-		0.520	Continuing	Continuing	Continuing
Miscellaneous	WR	NSWC Activities : Not Specified	2.303	0.000	Oct 2016	0.252	Nov 2017	0.158	Nov 2018	-		0.158	Continuing	Continuing	Continuing
DAWDF	Various	Not Specified : Not Specified	0.018	0.000		0.000		0.000		-		0.000	0.000	0.018	-
Subtotal		6.373	0.433		0.763			0.678		-		0.678	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			109.817	15.485		19.118		16.936		-		16.936	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

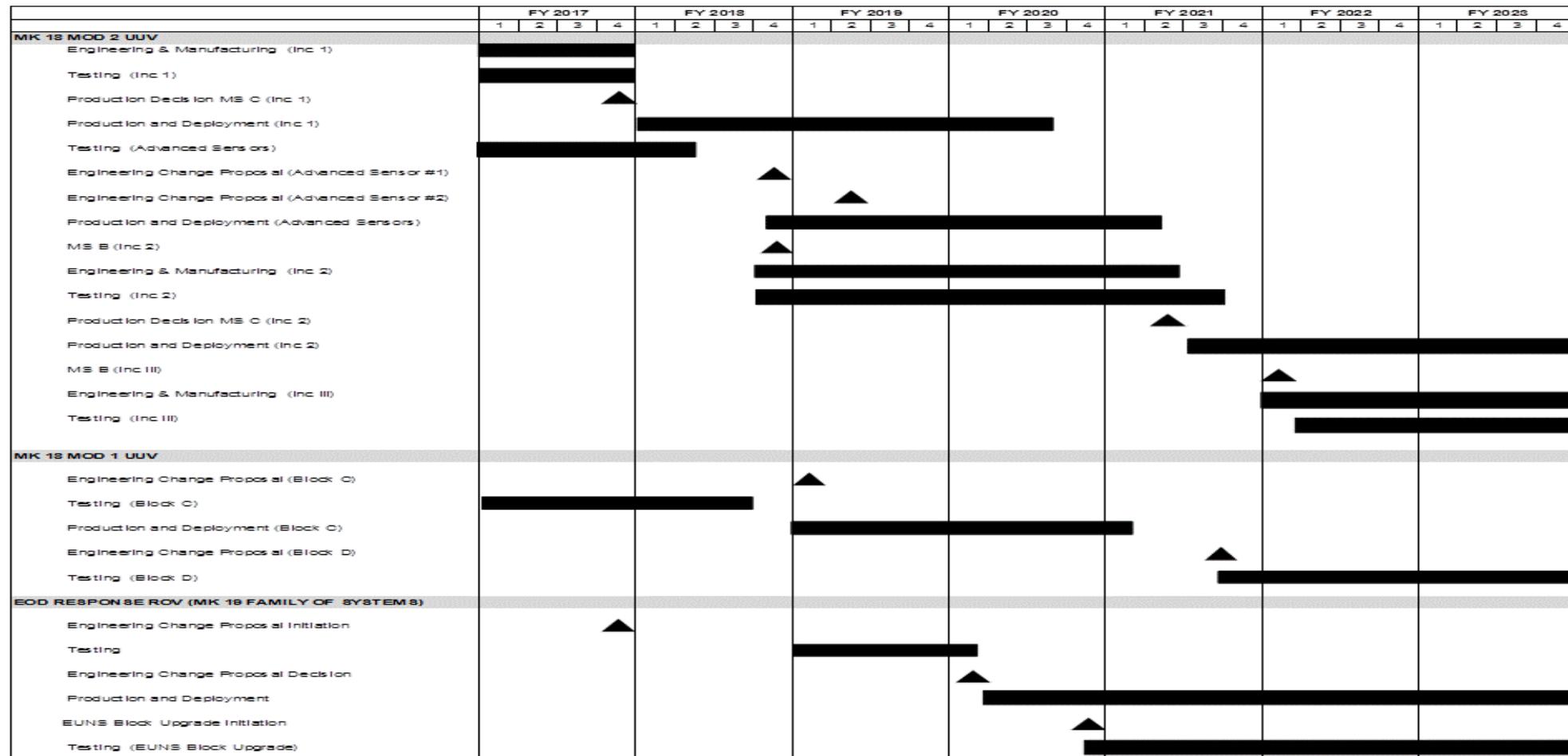
1319 / 4

R-1 Program Element (Number/Name)

PE 0603654N / JT Service Explosive Ordn Dev

Project (Number/Name)

4023 / VSW MCM/Force Protection UUV



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 4023 / VSW MCM/Force Protection UUV		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Year				
Proj 4023				
TITLE: MK 18 MOD 2 UUV		1	2017	4
---Engineering & Manufacturing (Inc 1)		1	2017	4
---Testing (Inc 1)		1	2017	4
---Production Decision MS C (Inc 1)		4	2017	4
---Production and Deployment (Inc 1)		1	2018	3
---Testing (Advance Sensors)		1	2017	2
---Engineering Change Proposal (Advanced Sensors #1)		4	2018	4
---Engineering Change Proposal (Advanced Sensors #2)		2	2019	2
---Production and Deployment (Advanced Sensors)		4	2018	1
---MS B (Inc 2)		4	2018	4
---Engineering & Manufacturing (Inc 2)		4	2018	2
---Testing (Inc 2)		4	2018	3
---Production Decision MS C (Inc 2)		2	2021	2
---Production and Deployment (Inc 2)		3	2021	4
---MS B (Inc III)		1	2022	1
---Engineering & Manufacturing (Inc III)		1	2022	4
---Testing (Inc III)		2	2022	4
TITLE: MK 18 MOD 1 UUV		1	2017	4
---Engineering Change Proposal (Block C)		1	2019	1
---Testing (Block C)		1	2017	3
---Production and Deployment (Block C)		1	2019	1

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603654N / JT Service Explosive Ordn Dev	Project (Number/Name) 4023 / VSW MCM/Force Protection UUV		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	3	2021	3	2021
	4	2021	4	2023
	1	2017	4	2023
	4	2017	4	2017
	1	2019	1	2020
	1	2020	1	2020
	2	2020	4	2023
	4	2020	4	2020
	4	2020	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)									
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603713N / Ocean Engineering Tech Dev									
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
Total Program Element	60.660	4.639	8.212	5.915	-	5.915	5.619	5.731	5.845	5.965	Continuing	Continuing		
0099: Deep Submergence Bio Med Dev	32.350	3.555	4.691	4.487	-	4.487	4.360	4.444	4.534	4.627	Continuing	Continuing		
0394: Shallow Depth Diving EQ	28.310	1.084	3.521	1.428	-	1.428	1.259	1.287	1.311	1.338	Continuing	Continuing		
A. Mission Description and Budget Item Justification														
Developments in this program will enable the U.S. Navy to overcome deficiencies that constrain manned diving operations in several critical areas such as submarine rescue, recovery, salvage, underwater ship husbandry, underwater construction and naval special operations. This program develops biomedical technology, diver life support equipment, and the systems, tools, and procedures to permit manned underwater operations and enhance diver performance and safety.														
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget				4.556	8.212	6.021	-	-						
Current President's Budget				4.639	8.212	5.915	-	-						
Total Adjustments				0.083	0.000	-0.106	-	-						
• Congressional General Reductions				-	-	-	-	-						
• Congressional Directed Reductions				-	-	-	-	-						
• Congressional Rescissions				-	-	-	-	-						
• Congressional Adds				-	-	-	-	-						
• Congressional Directed Transfers				-	-	-	-	-						
• Reprogrammings				0.151	0.000	-	-	-						
• SBIR/STTR Transfer				-0.068	0.000	-	-	-						
• Rate/Misc Adjustments				0.000	0.000	-0.106	-	-						
Change Summary Explanation														
Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort.														

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev				Project (Number/Name) 0099 / Deep Submergence Bio Med Dev				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0099: Deep Submergence Bio Med Dev	32.350	3.555	4.691	4.487	-	4.487	4.360	4.444	4.534	4.627	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This project:

1) Develops advanced biomedical and bioengineering technology for medical and life support enhancement to decrease submariner deaths and permanent injury in a disabled submarine (DISSUB) and during submarine escape and rescue;

2) Conducts research for diver health, safety, and effectiveness:

- to increase understanding of human performance and enhanced diver stress management and survivability in high stress environments such as in cold/warm water and at altitude; and - to validate and improve the accuracy of assumptions associated with equipment testing and certification, diving procedures, and diver biomedical physiology.

Deliverables for DISSUB include: medical guidance/procedures increasing submariner survivability for submarine escape and rescue (including new Submarine Rescue Diving and Recompression System (SRDRS)), life support parameters, medical procedures for life support; exposure and mitigation guidance for atmospheric contaminants, high levels of oxygen and/or carbon dioxide; prevention and treatment of decompression sickness and pulmonary oxygen toxicity; and senior survivor expert decision system.

Deliverables for diver health and safety include: decompression guidance in extreme environment diving with various breathing mixtures, temperatures, durations, and altitudes; exposure guidance for oxygen breathing; diver performance guidance based on physiological effects of diving; enhanced underwater swimming efficiency; enhanced diver thermal protection; collection of operational diving depth/time profiles to predict decompression risk, and exposure and mitigation guidance for divers experiencing underwater continuous noise, impulse noise, or underwater blast.

Requirements:

OPNAVINST 3150.27C, Navy Diving Policy and Joint Military Diving Technology and Training Program, 24 Jun 2016

Navy Salvage and Navy Diving Capabilities-Based Assessment (CBA) Report, 19 Dec 2013

NAPDD #587-873, Deep Submergence Biomedical Development, 23 Nov 1999

NAVSEA Instruction 3900.10, Management of the Deep Submergence Biomedical Research and Development Program, 4 Feb 2003

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Title: Deep Submergence Bio Med Dev - Diver Health and Safety	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
		2.029	2.396	2.244	0.000	2.244

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Diver Health and Safety Research: Novel methods for decompression safety and treatment of decompression sickness/arterial gas embolism. Advanced decompression models for extreme environments, including thermally challenging, long duration, multi-gas, and/or diving at altitude. Diving physiology advances in exercise, thermal exposure, oxygen/carbon dioxide alterations, other gas mixture alterations, hydration, and sustained operations. Develop pulmonary oxygen toxicity exposure limits. Provide pulmonary and oxygen toxicity mitigation strategies. Develop an advanced diver thermal model. Develop advanced insulation garments for diver thermal protection. Develop guidance for optimizing thermal control during decompression. Develop guidelines for conduct of diving operations at altitude. Develop guidance for infra- and ultra-sound diver exposure. Continue collection of operational and research dive data for inclusion in advanced probabilistic decompression models. Investigate diver in-water maladies. Develop/improve real-time decompression guidance and dive planning. Research procedures for assessing and mitigating risk for diving in contaminated water.	FY 2018 Plans: Perform numerous mixed-gas, manned diving experiments to update surface-supplied helium-oxygen deep diving decompression tables which put divers at high risk for decompression sickness and felt to be too unsafe to use. Develop decompression guidance/procedures for diving at altitude using special diving apparatus. These manned diving experiments, required to evaluate decompression protocols, are labor intensive, requiring long days to provide adequate time for test subjects to decompress under constant supervision of diving watchstanders, investigators, medical personnel and other support staff and consequently more expensive than smaller scale and unmanned studies. The studies also require significant amounts of helium to produce the various helium-oxygen gas mixtures needed for divers breathing gas and the cost of helium continues to rise at double-digit annual rates. Continue development of vital decompression, thermal, physiological, breathing resistance and oxygen tolerance/toxicity recommendations including contributions by reengaged university partners. Reengaging these university partners in FY-18 is essential to sustaining the very small research base needed to support Navy diver occupational health and safety. The university and Navy laboratories (Navy Experimental Diving Unit, Panama City, FL; Naval Submarine Medical Research Laboratory, Groton, CT; Naval Medical Research Center, Bethesda, MD) will continue underwater physiological investigation to mitigate the risks of diving in the expanding Fleet mission areas of salvage, underwater ship husbandry, explosive ordnance disposal, underwater construction and special warfare. Future efforts will depend in part on the outcomes of studies currently in progress.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603713N / Ocean Engineering Tech Dev	0099 / Deep Submergence Bio Med Dev				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
Additional work planned for FY18 resulting from the recent Technical Advisory Board proposal review process includes: A software planning tool will be created to provide exposure guidance for divers who may be exposed to continuous, intermittent, or impulse noise while underwater. Decompression during diving at altitude will be man-tested to update current guidance. An updated decompression algorithm will be designed for the Navy Dive Computer for Helium-Oxygen diving with a rebreather. A ketogenic diet will be evaluated for its ability to reduce central nervous system oxygen toxicity (e.g., seizures) in working divers. An underwater pulse oximeter will be designed and tested for its ability to provide timely warning to a diver of impending hypoxia. Investigations into basic physiology for repeated, long hyperoxic dives while exercising will also take place.		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2019 Base Plans: FY19 Base plans involve continued support for development of probabilistic models of Central Nervous System and Pulmonary Oxygen Toxicity in our ongoing efforts to expand the range of safe diving depths for divers using rebreathers. This work will also have relevance for disabled submarine response planning. Optimizing performance of dive teams operating at high altitude will continue to be an area of focus. Work will continue investigating the effects of hyperoxia during repeated, exertional, long-duration dives, with the objective of providing guidance to operational divers on mitigating the performance-impairing effects of whole body oxygen toxicity. Development of a software planning tool for divers at risk of exposure to underwater noise hazards will proceed as will work developing expanded altitude decompression tables. Investigation into the utility of a water-proofed pulse oximeter to reduce the risk of hypoxia for rebreather divers will be ongoing and efforts to determine whether a ketogenic diet can reduce the risk of seizures in divers breathing high partial pressures of oxygen will continue. We will also be soliciting research proposals to advance the work described in this section and continue underwater physiological investigation to mitigate the risks of diving in the expanding Fleet mission areas of salvage, underwater ship husbandry, explosive ordnance disposal, underwater construction and special warfare. Future efforts will depend in part on the outcomes of studies currently in progress. Continuing our partnership with Navy and University laboratories will be critical to our success as will cultivating new relationships with industry and academia.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Decrease from FY18 to FY19 is due to process improvements and inflationary changes requiring a decrease of \$152 thousand resulting in the funding of one additional research project.						
Title: Deep Submergence Bio Med Dev - Submarine Rescue Description: Submarine Rescue/Escape Research: Provide decompression procedures for pressurized SRDRS operators. Investigate adjunctive therapies for treating DISSUB survivors. Provide updated guidance for food, water, clothing, medical supplies to enhance survival of submarine crews awaiting rescue. Develop/provide flexible computer-generated decompression schedules for wide range of conditions in a DISSUB. Develop DISSUB medical triage procedures and support DISSUB survival trials. Develop mitigation strategies to reduce hyperoxic exposures in closed vehicles/compartments. Develop treatment guidance for decompression sickness and arterial gas embolism in submarine escape and rescue. Investigate the use of novel pharmacologic agents to reduce decompression risk and/or oxygen toxicity in submarine rescuees. Develop/deploy toxic gas analyzer for use in pressurized DISSUB rescue. Investigate interventions for toxicological problems in DISSUB survivors. Develop strategies to minimize decompression sickness and arterial gas embolism with Submarine Escape and Immersion Suit (SEIS) training. FY 2018 Plans: Work will continue on development of mitigation strategies for pulmonary oxygen toxicity for rescued submariners, finalizing design of toxic gas analyzers for URC, determining whether an anti-inflammatory medication (Doxycycline) can mitigate the risk of DCS for decompressing submarine rescuees, and sheep studies involving shallow saturation scenarios evaluating oxygen prebreathing to increase surface interval times before onset of DCS. Multiple experimental manned air saturation dives will be performed to develop protocols that can be used to decrease submariner deaths during submarine escape and rescue from a pressurized disabled submarine too shallow for safe attachment of the Navy's submarine rescue vehicle. These saturation diving experiments, required to evaluate decompression protocols, are labor intensive, requiring 24/7 support and consequently more expensive than smaller scale studies. Current submarine rescue deep decompression schedules are theoretical due to ethical concerns about safe manned testing. These schedules will be tested with swine to determine the morbidity/mortality and provide recommendations as to whether the schedules require change. Stressors in a DISSUB will be studied to determine the effect on Senior Survivor cognition and decision making at critical times. Additionally, the disabled submarine and disabled rescue vehicle may result in hyperthermia and dehydration for survivors. Dehydration can worsen hyperthermia. The combination	Articles: 1.526 - 2.295 - 2.243 - 0.000 - 2.243 -					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev				Project (Number/Name) 0099 / Deep Submergence Bio Med Dev			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
of hyperthermia and dehydration will be tested to determine if current human thermoregulation models are adequate and/or accurate.										
<p>FY 2019 Base Plans: FY19 Base plans involve continued support for studies to develop decompression protocols with or without oxygen pre-breathing for use with the Submarine Decompression System (SDS) as well as development of oxygen toxicity probabilistic models (CNS initially, then Pulmonary). Animal work will continue using sheep to develop protocols that will reduce the risk of DCS for submariners rescued without the availability of Transfer Under Pressure capability. Analysis of the impact DISSUB stressors have on submariner cognition and decision-making will continue, leading to recommendations for changes to the Guard Book depending on the results. Finally, investigation of the relationship between hyperthermia and dehydration will proceed, seeking to improve our thermal stress models to allow predictions of environmental conditions and recommendations regarding mitigations. We will also be soliciting research proposals to advance the work described in this section and continue to pursue answers to questions related to the unique physiological stressors associated with the DISSUB environment.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort.</p>										
Accomplishments/Planned Programs Subtotals					3.555	4.691	4.487	0.000	4.487	
C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete
• OPN/0955: Deep Subm Sys Proj (DSSP) Equip	0.806	4.178	3.629	-	3.629	2.909	2.971	3.029	3.091	Continuing
Remarks										

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev
D. Acquisition Strategy Integrated thrust area teams (e.g., decompression research) are established with university, commercial, and in-house Navy labs to jointly execute biomedical R&D. Peer review of research proposals accomplished by independent Technical Advisory Board. Annual review of progress by Executive Review Board (CNO/NAVSEA/ONR/BUMED). Program management by 0-6 Undersea Medical Officer. Contracting by competitive process using BAA and leveraging ONR capabilities.		
E. Performance Metrics Quarterly Program Reviews of researcher progress measured against research proposal goals and timelines.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev				Project (Number/Name) 0099 / Deep Submergence Bio Med Dev							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Diving Equipment Product Development	C/CPAF	Phoenix International : Largo, MD	0.738	0.133	Aug 2017	0.000		0.000		-		0.000	0.000	0.871	-
Subtotal			0.738	0.133		0.000		0.000		-		0.000	0.000	0.871	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	WR	NEDU : Panama City, FL	21.248	1.745	Nov 2016	1.270	Nov 2017	0.671	Nov 2018	-		0.671	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	NMRC : Silver Spring, MD	8.061	0.349	Nov 2016	1.069	Nov 2017	0.484	Nov 2018	-		0.484	Continuing	Continuing	Continuing
Development Test & Evaluation	Various	DUKE UNIV : Durham, NC	0.940	0.181	Jul 2017	1.115	Jul 2018	1.060	Jul 2019	-		1.060	Continuing	Continuing	Continuing
Development Test & Evaluation	C/CPFF	ROH : Arlington, VA	0.077	0.205	May 2017	0.030	May 2018	0.030	May 2019	-		0.030	Continuing	Continuing	Continuing
Development Test & Evaluation	Various	Various : Various	0.000	0.000		0.236	Mar 2018	1.261	Mar 2019	-		1.261	Continuing	Continuing	Continuing
Development Test & Evaluation	C/FFP	WISCONSIN : Madison, WI	0.523	0.464	Feb 2017	0.349	Feb 2018	0.335	Feb 2019	-		0.335	Continuing	Continuing	Continuing
Development Test & Evaluation	C/FFP	SUNY : Buffalo, NY	0.272	0.414	Apr 2017	0.592	Apr 2018	0.614	Apr 2019	-		0.614	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	NSWC : Panama City, FL	0.000	0.039	Jun 2017	0.000		0.000		-		0.000	0.000	0.039	-
Subtotal			31.121	3.397		4.661		4.455		-		4.455	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev						Project (Number/Name) 0099 / Deep Submergence Bio Med Dev					
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract		
Travel	Various	Various : Various	0.491	0.025	Oct 2016	0.030	Oct 2017	0.032	Oct 2018	-	0.032	Continuing	Continuing		
Subtotal				0.491	0.025	0.030	0.032		-	0.032	Continuing	Continuing	N/A		
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			32.350	3.555		4.691		4.487		-	4.487	Continuing	Continuing	N/A	
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

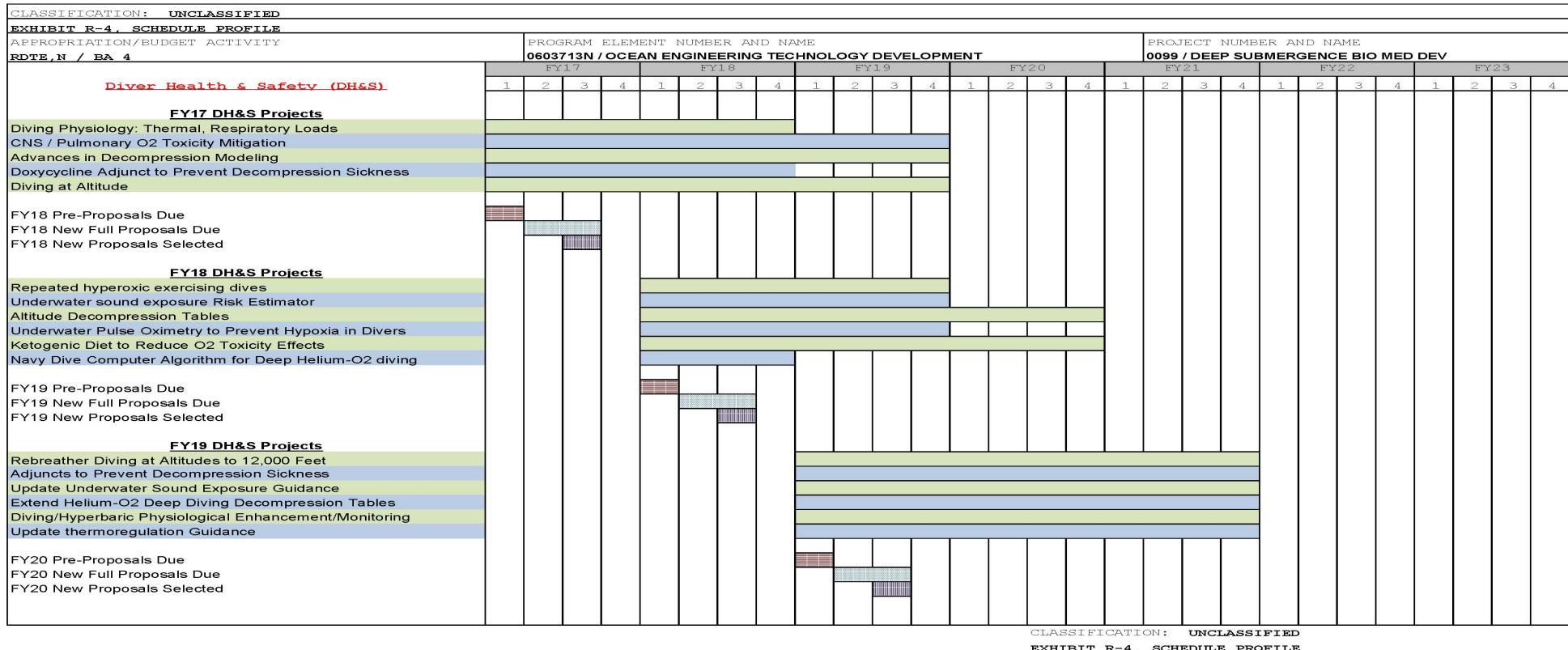
1319 / 4

R-1 Program Element (Number/Name)

PE 0603713N / Ocean Engineering Tech Dev

Project (Number/Name)

0099 / Deep Submergence Bio Med Dev



CLASSIFICATION: UNCLASSIFIED

EXHIBIT R-4, SCHEDULE PROFILE

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

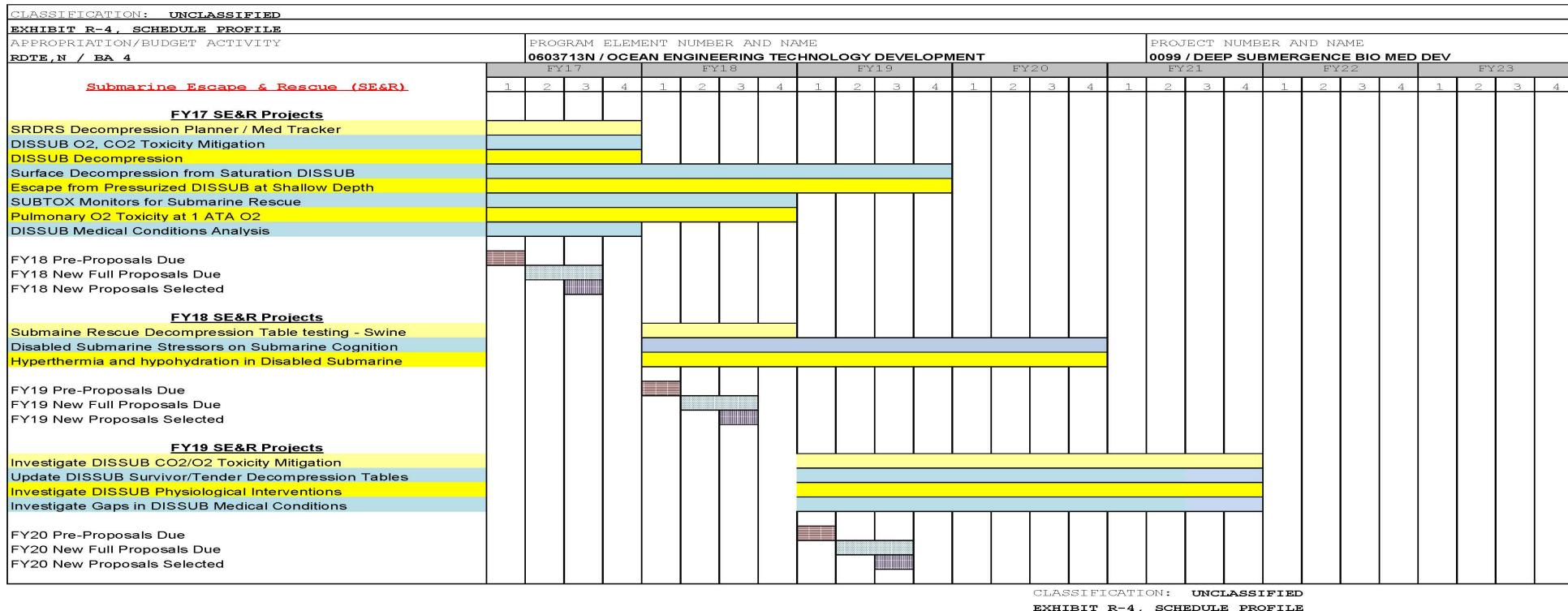
1319 / 4

R-1 Program Element (Number/Name)

PE 0603713N / Ocean Engineering Tech Dev

Project (Number/Name)

0099 / Deep Submergence Bio Med Dev



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 0099</i>				
Diver Health & Safety (DH&S): FY17 DH&S Projects: Diving Physiology: Thermal, Respiratory Loads		1	2017	4
Diver Health & Safety (DH&S): FY17 DH&S Projects: CNS / Pulmonary O2 Toxicity Mitigation		1	2017	4
Diver Health & Safety (DH&S): FY17 DH&S Projects: Advances in Decompression Modeling		1	2017	4
Diver Health & Safety (DH&S): FY17 DH&S Projects: Doxycycline Adjunct to Prevent Decompression Sickness		1	2017	4
Diver Health & Safety (DH&S): FY17 DH&S Projects: Diving at Altitude		1	2017	4
Diver Health & Safety (DH&S): FY18 Pre-Proposals Due		1	2017	1
Diver Health & Safety (DH&S): FY18 New Full Proposals Due		2	2017	3
Diver Health & Safety (DH&S): FY18 New Proposals Selected		3	2017	3
Diver Health & Safety (DH&S): FY18 DH&S Projects: Repeated hyperoxic exercising dives		1	2018	4
Diver Health & Safety (DH&S): FY18 DH&S Projects: Underwater sound exposure Risk Estimator		1	2018	4
Diver Health & Safety (DH&S): FY18 DH&S Projects: Altitude Decompression Tables		1	2018	4
Diver Health & Safety (DH&S): FY18 DH&S Projects: Underwater Pulse Oximetry to Prevent Hypoxia in Divers		1	2018	4
Diver Health & Safety (DH&S): FY18 DH&S Projects: Ketogenic Diet to Reduce O2 Toxicity Effects		1	2018	4
Diver Health & Safety (DH&S): FY18 DH&S Projects: Navy Dive Computer Algorithm for Deep Helium-O2 diving		1	2018	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Diver Health & Safety (DH&S): FY19 Pre-Proposals Due	1	2018	1	2018
Diver Health & Safety (DH&S): FY19 New Full Proposals Due	2	2018	3	2018
Diver Health & Safety (DH&S): FY19 New Proposals Selected	3	2018	3	2018
Diver Health & Safety (DH&S): FY19 DH&S Projects: Rebreather Diving at Altitudes to 12,000 Feet	1	2019	4	2021
Diver Health & Safety (DH&S): FY19 DH&S Projects: Adjuncts to Prevent Decompression Sickness	1	2019	4	2021
Diver Health & Safety (DH&S): FY19 DH&S Projects: Update Underwater Sound Exposure Guidance	1	2019	4	2021
Diver Health & Safety (DH&S): FY19 DH&S Projects: Extend Helium-O2 Deep Diving Decompression Tables	1	2019	4	2021
Diver Health & Safety (DH&S): FY19 DH&S Projects: Diving/Hyperbaric Physiological Enhancement/Monitoring	1	2019	4	2021
Diver Health & Safety (DH&S): FY19 DH&S Projects: Update thermoregulation Guidance	1	2019	4	2021
Diver Health & Safety (DH&S): FY20 Pre-Proposals Due	1	2019	1	2019
Diver Health & Safety (DH&S): FY20 New Full Proposals Due	2	2019	3	2019
Diver Health & Safety (DH&S): FY20 New Proposals Selected	3	2019	3	2019
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: SRDRS Decompression Planner / Med Tracker	1	2017	4	2017
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: DISSUB O2, CO2 Toxicity Mitigation	1	2017	4	2017
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: DISSUB Decompression	1	2017	4	2017
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: Surface Decompression from Saturation DISSUB	1	2017	4	2019
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: Escape from Pressurized DISSUB at Shallow Depth	1	2017	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: SUBTOX Monitors for Submarine Rescue	1	2017	4	2018
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: Pulmonary O2 Toxicity at 1 ATA O2	1	2017	4	2018
Submarine Escape & Rescue (SE&R): FY17 SE&R Projects: DISSUB Medical Conditions Analysis	1	2017	4	2017
Submarine Escape & Rescue (SE&R): FY18 Pre-Proposals Due	1	2017	1	2017
Submarine Escape & Rescue (SE&R): FY18 New Full Proposals Due	2	2017	3	2017
Submarine Escape & Rescue (SE&R): FY18 New Proposals Selected	3	2017	3	2017
Submarine Escape & Rescue (SE&R): FY18 SE&R Projects: Submarine Rescue Decompression Table testing - Swine	1	2018	4	2018
Submarine Escape & Rescue (SE&R): FY18 SE&R Projects: Disabled Submarine Stressors on Submarine Cognition	1	2018	4	2020
Submarine Escape & Rescue (SE&R): FY18 SE&R Projects: Hyperthermia and hypohydration in Disabled Submarine	1	2018	4	2020
Submarine Escape & Rescue (SE&R): FY19 Pre-Proposals Due	1	2018	1	2018
Submarine Escape & Rescue (SE&R): FY19 New Full Proposals Due	2	2018	3	2018
Submarine Escape & Rescue (SE&R): FY19 New Proposals Selected	3	2018	3	2018
Submarine Escape & Rescue (SE&R): 'FY19 SE&R Projects: Investigate DISSUB CO2/O2 Toxicity Mitigation	1	2019	4	2021
Submarine Escape & Rescue (SE&R): 'FY19 SE&R Projects: Update DISSUB Survivor/Tender Decompression Tables	1	2019	4	2021
Submarine Escape & Rescue (SE&R): 'FY19 SE&R Projects: Investigate DISSUB Physiological Interventions	1	2019	4	2021
Submarine Escape & Rescue (SE&R): 'FY19 SE&R Projects: Investigate Gaps in DISSUB Medical Conditions	1	2019	4	2021
Submarine Escape & Rescue (SE&R): FY20 Pre-Proposals Due	1	2019	1	2019
Submarine Escape & Rescue (SE&R): FY20 New Full Proposals Due	2	2019	3	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0099 / Deep Submergence Bio Med Dev		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Submarine Escape & Rescue (SE&R): FY20 New Proposals Selected	3	2019	3	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603713N / Ocean Engineering Tech Dev				0394 / Shallow Depth Diving EQ				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0394: Shallow Depth Diving EQ	28.310	1.084	3.521	1.428	-	1.428	1.259	1.287	1.311	1.338	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			
A. Mission Description and Budget Item Justification													
This project develops systems to support submarine escape and rescue missions, and conventional diver operations. Diver operations include ship husbandry, salvage/recovery, and submarine rescue operations to support national, as well as Navy, needs around the world. Modern certifiable diving systems that ensure diver safety and allow maximum work efficiency will replace currently antiquated systems. R&D will be performed in the areas of diver efficiency, visual enhancement, contaminated water diving, diver thermal protection, and recompression chamber technology.													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
Title: Shallow Depth Diving EQ - Diving Articles: Description: Continued research on contaminated water diving and research on diver thermal protection, C02 monitors and diver sound protection. FY 2018 Plans: Work will be completed on the HUD portion of the Divers Augmented Visual Display (DAVD) and manned testing of the new equipment will be conducted. This will complete one of three parts of this system. Continue work on a 3D sonar and diver tracking system that is intended to integrate with the DAVD system. This will create a virtual model of the underwater environment that will be linked to real-time location of the diver thus allowing extensive visual range and target location even in no-visability waters. A flexible, double lock recompression chamber system contract (3-year) will be initiated that will provide a lightweight and small volume alternative to the existing Transportable Recompression Chamber System (TRCS). Testing will begin on a new SCUBA regulator to replace our inventory of older regulators that were designed in the 1960s. FY 2019 Base Plans: Begin work on a high resolution, high frequency, short range visualization system (HI RES SONAR) that will integrate with the Divers Augmented Visual Display (DAVD) system. This will allow accurate, real time visualization for use when conducting underwater search, salvage, ship husbandry, or construction in low visibility water. Testing on the modernized SCUBA regulator will be completed for all COTS versions selected for testing. Work will continue on the design and testing of a flexible double lock recompression chamber. FY 2019 OCO Plans:													
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total									
0.933	1.747	1.379	0.000	1.379									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018				
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev				Project (Number/Name) 0394 / Shallow Depth Diving EQ								
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A														
FY 2018 to FY 2019 Increase/Decrease Statement:														
Decrease of \$0.368 million is accounted for by a reduced 2nd year cost for the PCCI FLEX Chamber project and a reduction in the number and cost of DAVD projects in FY19.														
Title: Shallow Depth Diving EQ - Submarine Rescue						Articles:				0.151	1.774	0.049	0.000	0.049
Description: Submarine rescue decompression system permits decompression of submarine crew rescued from a pressurized, disabled submarine of pressures up to 6 atmospheres (ATA).							-	-	-	-	-	-	-	
FY 2018 Plans:														
Will complete manned testing, sea trials, certification and IOC for SRDRS TUP.														
FY 2019 Base Plans:														
Engineering analysis of pressurized rescue skirt.														
FY 2019 OCO Plans:														
N/A														
FY 2018 to FY 2019 Increase/Decrease Statement:														
Decrease of \$1.725M from FY18 to FY19 is due to scheduled certification and delivery of the Transfer Under Pressure (TUP) capability to the Navy during FY18. Decrease from FY18 to FY19 is in accordance with planned program profile and is not due to a negative action against this effort.														
Accomplishments/Planned Programs Subtotals										1.084	3.521	1.428	0.000	1.428
C. Other Program Funding Summary (\$ in Millions)														
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
• OPN/0955: Deep Subm Sys Proj (DSSP) Equip	0.806	4.178	3.629	-	3.629	2.909	2.971	3.029	3.091	Continuing	Continuing			
• OPN/1130: Diving and Salvage Equipment	8.176	10.619	10.706	-	10.706	11.940	10.814	10.881	11.078	0.000	121.031			
Remarks														

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0394 / Shallow Depth Diving EQ
D. Acquisition Strategy Diving Program acquisitions are executed and managed by SEA00C. Acquisitions are made for both COTS and developmental items as required to ensure adequate operational availability and safety of the diver. R&D projects are selected in March for a November award using a Broad Area Announcement. Submarine Rescue Systems - prime integration contract is in place and final efforts in pursuit of certification are underway.		
E. Performance Metrics Diving - Semi-annual program review with NEDU. Diving - Annual program review for each R&D project. Diving & Submarine Rescue - Quarterly execution assessments.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev				Project (Number/Name) 0394 / Shallow Depth Diving EQ							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - Design, Integration (PMS-391 TUP)	C/CPAF	Oceaneering : Hanover, MD	24.258	0.151	Oct 2017	1.774	Oct 2017	0.049	Jan 2019	-		0.049	0.000	26.232	-
Diving Equipment Product Development (00C)	Various	Various : Various	2.622	0.000		0.000		0.337	Oct 2018	-		0.337	Continuing	Continuing	Continuing
Diving Equipment Product Development (00C)	C/CPFF	PCCI : Alexandria, VA	0.329	0.000		0.887	Mar 2018	0.680	Jan 2019	-		0.680	0.000	1.896	-
Diving Equipment Product Development (00C)	C/CPFF	Penn state UARC : Not Specified	0.000	0.400	Jan 2017	0.200	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Diving Equipment Product Development (00C)	WR	NSWC-PC : Panama City, FL	0.453	0.130	Mar 2017	0.464	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			27.662	0.681		3.325		1.066		-		1.066	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test and Evaluation (00C)	WR	NEDU : Panama City, FL	0.048	0.403	Nov 2016	0.075	Mar 2018	0.250	Jan 2019	-		0.250	0.000	0.776	-
Subtotal			0.048	0.403		0.075		0.250		-		0.250	0.000	0.776	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel (00C)	Various	NAVSEA : Washington, DC	0.140	0.000		0.020	Oct 2017	0.022	Oct 2018	-		0.022	Continuing	Continuing	Continuing
SBIR Assessment	Various	Various : Various	0.443	0.000		0.074	Oct 2017	0.062	Oct 2018	-		0.062	0.000	0.579	-
Program Management Support (00C)	C/CPFF	Unknown : Not Specified	0.017	0.000		0.027	Mar 2018	0.028	Mar 2019	-		0.028	Continuing	Continuing	Continuing
Subtotal			0.600	0.000		0.121		0.112		-		0.112	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev			Project (Number/Name) 0394 / Shallow Depth Diving EQ						
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	28.310	1.084		3.521		1.428		-	1.428	Continuing	Continuing	N/A
Remarks												

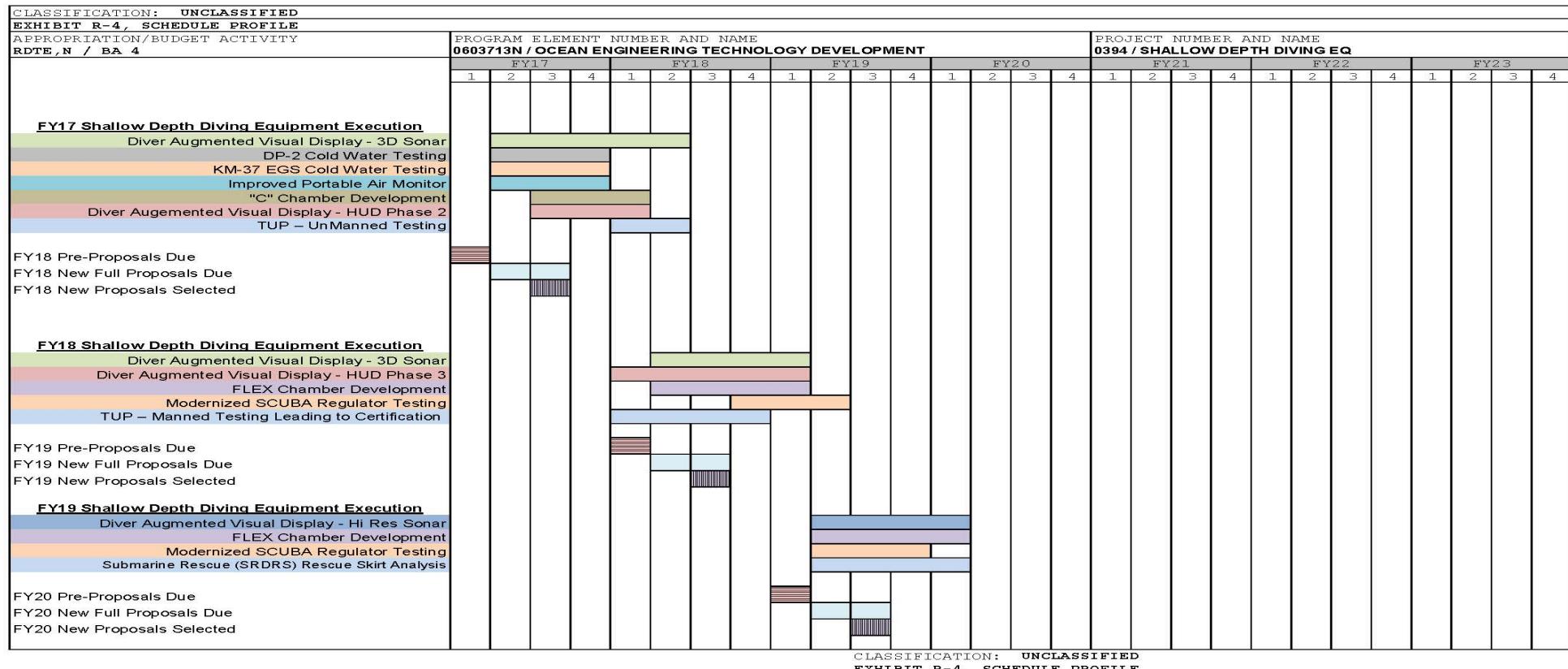
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603713N / Ocean Engineering Tech DevProject (Number/Name)
0394 / Shallow Depth Diving EQ

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0394 / Shallow Depth Diving EQ		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Year				
Proj 0394				
FY17 Diving Equipment Execution: Diver Augmented Visual Display - 3D Sonar	2	2017	2	2018
FY17 Diving Equipment Execution: DP-2 Cold Water Testing	2	2017	4	2017
FY17 Diving Equipment Execution: KM-37 EGS Cold Water Testing	2	2017	4	2017
FY17 Diving Equipment Execution: Improved Portable Air Monitor	2	2017	4	2017
FY17 Diving Equipment Execution: "C" Chamber Development	3	2017	1	2018
FY17 Diving Equipment Execution: Diver Augmented Visual Display - HUD Phase 2	3	2017	1	2018
FY17 Diving Equipment Execution: TUP - UnManned Testing	1	2018	2	2018
FY18 Pre-Proposals Due	1	2017	1	2017
FY18 New Full Proposals Due	2	2017	3	2017
FY18 New Proposals Selected	3	2017	3	2017
FY18 Diving Equipment Execution: Diver Augmented Visual Display - 3D Sonar	2	2018	1	2019
FY18 Diving Equipment Execution: Diver Augmented Visual Display - HUD Phase 3	1	2018	1	2019
FY18 Diving Equipment Execution: FLEX Chamber Development	2	2018	1	2019
FY18 Diving Equipment Execution: Modernized SCUBA Regulator Testing	4	2018	2	2019
FY18 Diving Equipment Execution: TUP Manned Testing Leading to Certification	1	2018	4	2018
FY19 Pre-Proposals Due	1	2018	1	2018
FY19 New Full Proposals Due	2	2018	3	2018
FY19 New Proposals Selected	3	2018	3	2018
FY19 Diving Equipment Execution: FY19 Diver Augmented Visual Display - Hi Res Sonar	2	2019	1	2020
FY19 Diving Equipment Execution: FLEX Chamber Development	2	2019	1	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603713N / Ocean Engineering Tech Dev	Project (Number/Name) 0394 / Shallow Depth Diving EQ		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	2	2019	4	2019
	2	2019	1	2020
	1	2019	1	2019
	2	2019	3	2019
	3	2019	3	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603721N / Environmental Protection								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	442.286	19.117	20.214	19.811	-	19.811	20.351	20.333	20.688	21.141	Continuing	Continuing	
0401: Shipboard Waste Mgmt	351.165	8.191	7.920	7.776	-	7.776	8.007	8.915	9.047	9.276	Continuing	Continuing	
0817: Environmental Sustainability Development (NESDI)	44.352	5.600	4.782	4.266	-	4.266	4.439	6.120	6.237	6.358	Continuing	Continuing	
9204: Marine Mammal Research	46.769	5.326	4.512	4.769	-	4.769	4.905	5.298	5.404	5.507	Continuing	Continuing	
9205: Marine Mammal Settlement	0.000	0.000	3.000	3.000	-	3.000	3.000	0.000	0.000	0.000	0.000	9.000	

A. Mission Description and Budget Item Justification

This program develops and evaluates processes, hardware, systems, operational procedures, scientific methods, and environmental studies that will allow the Navy to operate in U.S., foreign, and international waters, air, space, and land areas while complying with environmental laws, regulations, Executive Orders, policies and international agreements.

Many environmental laws, regulations, and policies impose restrictions on Navy training and testing, vessels, aircraft, and facilities that interfere with operations and/or increase the cost of operations. The Navy must be able to conduct its national security mission in compliance with applicable environmental requirements in the U.S. and abroad without compromising performance, safety, or health, while simultaneously minimizing the cost of compliance. The projects for this Program Element (PE) support the Navy's compliance with the (a) Clean Water Act, (b) Act to Prevent Pollution from Ships, (c) International Convention for the Prevention of Pollution from Ships, (d) DoD Regulations on Vessels Owned or Operated by the Department of Defense, (e) OPNAV Environmental and Natural Resources Program Manual, (f) Uniform National Discharge Standards [UNDS] Phase I Standard, (EO) 13148, Greening the Government Through Leadership in Environmental Management, (g) Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, (h) National Invasive Species Act of 1996, (i) Ballast Water Management for Control of Nonindigenous Species in Waters of the United States, (j) Clean Air Act, (k) Federal Insecticide, Fungicide, and Rodenticide Act, (l) Marine Mammal Protection Act, and (m) Endangered Species Act. References (a) through (m) establish Level I environmental protection requirements. Project 0401, Shipboard Waste Management, supports efforts that enable Navy ships and submarines to comply with laws, regulations, and policies in six major areas: (1) Liquid Wastes, (2) UNDS Rulemaking, (3) Hazardous Materials and Pollution Prevention, (4) Hull Antifouling Paints, (5) Technical Authority, and (6) Ballast Water Exchange Improvements. Project 0817, Environmental Sustainability Development, supports the development and validation of technologies to enable Navy facilities to comply with environmental laws, regulations, and policies in a cost-effective manner.

The Marine Mammal Research (MMR) program is responsible for applied research and works to address the Navy's key research needs and transition the results and technologies for use within the Navy's at-sea environmental compliance and permitting processes in compliance with the Marine Mammal Protection Act and the Endangered Species Act, with the goals of improving marine species impact analysis (including marine mammal take estimates), mitigation measures and monitoring capabilities. Key points of the MMR mission are: (1) Improve the best available science regarding the potential impacts to marine species from Navy activities, (2)

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity		R-1 Program Element (Number/Name)							
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		PE 0603721N / <i>Environmental Protection</i>							
Expand the technology and methods available to the U.S. Navy marine species monitoring program (3) Preserve core Navy readiness capabilities. This funding allows the Navy to avoid or reduce the chances of costly litigation for non-compliance.									
\$3.000M added in FY 2018 and FY2019 in accordance with settlement agreement under Marine Mammal Protection Act (new project created).									
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO				
Previous President's Budget		20.343	20.214	23.606	-				
Current President's Budget		19.117	20.214	19.811	-				
Total Adjustments		-1.226	0.000	-3.795	-				
• Congressional General Reductions		-	-						
• Congressional Directed Reductions		-	-						
• Congressional Rescissions		-	-						
• Congressional Adds		-	-						
• Congressional Directed Transfers		-	-						
• Reprogrammings		-	-						
• SBIR/STTR Transfer		-0.004	0.000						
• Program Adjustments		0.000	0.000	-2.988	-				
• Rate/Misc Adjustments		0.000	0.000	-0.807	-				
• Congressional Directed Reductions		-1.222	-	-	-				
Adjustments									
Change Summary Explanation									
The FY 2019 funding request was reduced by (\$.104) million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.									
Technical: FY19: TA reduced to support Ballast Water Management tasking related to procurement and testing of Navy approved Ballast Water Treatment System. Liquid Waste decrease due to completion of shipboard piping modifications for long-term assessment of sewage and graywater piping development, prevention, and cleaning. Non-copper Anti-fouling decrease reflects completion of in-situ testing of antifouling coatings.									
Schedule: Not applicable.									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 0401 / Shipboard Waste Mgmt			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0401: Shipboard Waste Mgmt	351.165	8.191	7.920	7.776	-	7.776	8.007	8.915	9.047	9.276	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Navy ships and submarines must routinely operate in U.S., international, and foreign waters, and visit numerous U.S. and foreign ports. No body of water is without environmental restrictions that impact the movements and operations of Navy vessels. Environmental requirements tend to be most restrictive in port and in coastal waters, where the Navy's increasing littoral presence places ships and submarines in discharge-restricted waters for longer periods of time. Growing international cooperation in addressing global environmental concerns is resulting in expanding areas of ocean considered environmentally susceptible, where special prohibitions on ship discharges and operations are imposed. Navy vessels must comply with applicable environmental legal requirements while maintaining continued access to all waters for operations, exercises, training, and port access. The large crews and limited on-board space of Navy ships and submarines severely constrain their ability to hold wastes for return to port for shore side disposal.

Project 0401, Shipboard Waste Management, evaluates and develops shipboard environmental equipment, systems, technologies, processes, and practices to comply with environmental laws, regulations, Executive Orders, international agreements, foreign-country requirements, and DoD and Navy policies. The project focuses on providing engineering criteria, design guidance, and performance specifications for selecting, procuring, installing, integrating, and operating environmental equipment and systems on Navy ships and submarines, and on defining and developing processes, procedures and logistics support requirements. Environmental equipment, systems, processes and practices must meet legal and environmental requirements and be reliable, maintainable and achievable at sea, and impose no or low manning burden. Environmental equipment and systems must meet Navy-unique shipboard requirements (performance, space, weight, shock, vibration, electromagnetic compatibility, manning, automation, etc.), incorporate integrated logistics support, minimize life-cycle cost, and include validated acquisition, design, installation, and operating documentation. Shipboard processes and practices must be feasible and must be compatible with ship and submarine operational, maintenance, manning, habitability, health, and safety requirements. It also addresses afloat environmental issues other than shipboard wastes, e.g., access to environmental data for planning Fleet operations and exercises.

The Afloat Environmental Quality Program supports the designated Technical Warrant Holders for Environmental Systems & Materials Engineering, with responsibility and accountability for ensuring that ships and submarines are designed and upgraded, and can be operated, in compliance with existing and anticipated environmental requirements while minimizing total ownership cost and manning. This responsibility encompasses legacy platforms and new vessel designs, as well as Fleet operations exercises, and training.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<i>Title:</i> Technical Authority (TA)	0.750	1.685	1.500	0.000	1.500

Articles:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Funding in support of TA utilized to develop waste stream design criteria and guidance. This includes system/technology selection, processing capacity, interfaces, shipboard integration, test and qualification protocols, processes and practices, and performance specifications.						
FY19 TA reduced to support Ballast Water Management tasking related to procurement and testing of Navy approved Ballast Water Treatment System.						
FY 2018 Plans: <ul style="list-style-type: none">- Identify waste management systems for detailed acquisition and evaluation.- Perform a study on Rapid Tank design to minimize residuals and for optimized operation.- Work with Fleet, acquisition programs, and technical authorities to review and provide comments on issues, risks, and opportunities so as minimize the cost and risk to the Navy.- Review emergent ship spills and other oil spill discharge violations and determine root causes.- Identify opportunities to reduce the risk of future oil spill violations and communicate these to the fleet.- Meet with NATO and foreign Navy data exchange partners to leverage lessons learned on afloat environmental compliance.- Continue development of environmental equipment/system requirements documentation, design criteria/guidance, specification standards, and certification protocols.- Perform assessments of emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations.- Investigate impact of the use of environmentally sound refrigerants on refrigeration systems.						
FY 2019 Base Plans: <ul style="list-style-type: none">- Identify waste management systems for detailed acquisition and evaluation.- Work with Fleet, acquisition programs, and technical authorities to review and provide comments on issues, risks, and opportunities so as minimize the cost and risk to the Navy.- Review emergent ship spills and other oil spill discharge violations and determine root causes.- Identify opportunities to reduce the risk of future oil spill violations and communicate these to the fleet.- Meet with NATO and foreign Navy data exchange partners to leverage lessons learned on afloat environmental compliance.- Continue development of environmental equipment/system requirements documentation, design criteria/guidance, specification standards, and certification protocols.- Perform assessments of emergent air emission processes and technologies to enable effective compliance at minimal life cycle cost and risk to operations.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue to investigate impact of environmentally sound refrigerants and refrigerant systems.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY19 funds to support Ballast Water Management tasking related to procurement and testing of Navy approved Ballast Water Treatment System.						
Title: Liquid Wastes	Articles:	2.451	2.354	2.275	0.000	2.275
Description: Navy ships must be able to operate anywhere in the world, train realistically, and visit any port without operational, safety, or health constraints arising due to international, Federal, and local environmental regulations. This effort addresses liquid wastes in two (2) major areas: Marine Sanitation Devices (MSDs) and Marine Pollution Control Devices.		-	-	-	-	-
FY19 decrease due to completion of shipboard piping modifications for long-term assessment of sewage and graywater piping development, prevention, and cleaning.						
FY 2018 Plans:						
- Perform assessments of emergent commercial off the shelf Marine Pollution Control processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. Identify systems for detailed acquisition and evaluation						
Oil Pollution Abatement:						
- Complete installation package for shipboard testing of a commercial centrifugal oil water separator including ship check, installation drawings, and adjudication of Navy ship environmental requirements.						
- Initiate shipboard evaluation of centrifugal Oil Water Separator (OWS) including system inspection and operational checks.						
- Continue development of specifications for Navy centrifugal OWS.						
- Finalize and demonstrate in the Fleet procedures for regenerating membrane systems.						
- Investigate oil content monitor compatibility with centrifugal OWS.						
Non-Oily Waste:						
- Complete laboratory test and evaluation of membrane bioreactor layup and startup procedures and tools.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
- Continue laboratory evaluation of microbial biosensor to assess bioreactor health. - Continue long-term assessment of sewage and graywater piping development, prevention and cleaning. - Initiate shipboard evaluation of vacuum instrumentation isolation					
FY 2019 Base Plans: - Perform assessments of emergent commercial off the shelf Marine Pollution Control processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. Identify systems for detailed acquisition and evaluation					
Oil Pollution Abatement: - Perform shipboard evaluation of centrifugal oil water separator (OWS). - Develop specifications for Navy centrifugal OWS. - Initiate laboratory evaluation of alternative membrane coatings. - Initiate laboratory evaluation of commercial Wilden Transfer Pumps. - Begin specification development for submersible pumps. - Investigate commercial oil content monitors for potential new discharge standard. - Refine specifications for Navy small ship OWS.					
Non-Oily Waste: - Complete laboratory evaluation of sludge pretreatment system to support procurement specification development. - Prepare for shipboard evaluation of grease pretreatment system - Complete documentation for new hydrogen sulfide gas sensor. - Continue long-term assessment of sewage and graywater piping development, prevention and cleaning. - Initiate laboratory evaluation of alternative vacuum pumps.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: No significant changes from FY18 to FY19.					
Title: Hazardous Material Control and Management	Articles:	1.000	0.995	1.015	0.000
Description: A wide variety of Hazardous Materials (HM) are used to construct, operate and maintain Navy ships and submarines. These HMs include cleaning compounds, solvents, adhesives, sealants, corrosion		-	-	-	1.015

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
preventive compounds, acids, alkalis, oxidizers, lubricants, functional fluids, and many other products. HM addresses environmental, safety and health risks to ship construction workers, Ship's Force (S/F), and shipyard workers.				
FY19 increase for acquisition, installation and shipboard evaluation of automatic cleaner dispensers, and finalization of commercial item description.				
FY 2018 Plans: <ul style="list-style-type: none"> - Perform assessments of emergent commercial off the shelf hazardous material management processes and pollution prevention technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify hazardous material control/pollution prevention systems for detailed acquisition and evaluation. - Revise the NAVSEA Hazardous Material Avoidance Process. - Identify, research, and evaluate less hazardous or non-hazardous substitutes for high-risk hazardous materials. - Acquire, install and perform shipboard evaluation of automated cleaner dispensers. - Initiate commercial item description for automatic cleaner dispensers. 				
FY 2019 Base Plans: <ul style="list-style-type: none"> - Perform assessments of emergent commercial off the shelf hazardous material management processes and pollution prevention technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify hazardous material control/pollution prevention systems for detailed acquisition and evaluation. - Revise the NAVSEA Hazardous Material Avoidance Process. - Identify, research, and evaluate less hazardous or non-hazardous substitutes for high-risk hazardous materials. - Acquire, install and perform shipboard evaluation of automated cleaner dispensers. - Finalize commercial item description for automatic cleaner dispensers. 				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: No significant changes from FY18 to FY19.				
Title: Solid Waste Management	Articles:	1.190	1.000	1.050
		-	-	0.000
				1.050

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Description: Solid Waste Management supports the Act to Prevent Pollution from Ships (APPS) which regulates all garbage discharges from ships at sea. FY19 will address APPS compliant Solid Waste Management systems.					
FY 2018 Plans: - Perform assessments of emergent commercial off the shelf solid waste management processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify solid waste systems for detailed acquisition and evaluation. - Complete laboratory test and evaluation and prepare final reports on the Act to Prevent Pollution from Ships (APPS) compliant Micro Auto Gasification System.					
FY 2019 Base Plans: - Perform assessments of emergent commercial off the shelf solid waste management processes and technologies that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify solid waste systems for detailed acquisition and evaluation. - Begin installation and testing preparation for the shipboard evaluation and Navy ship environmental testing of convertor, Marine Solid Waste Incinerator and/or Micro Auto Gasification System based on laboratory test results. - Refine Navy ship acquisition requirements for Act to Prevent Pollution from Ships (APPS) compliant solid waste processing systems.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: No significant changes from FY18 to FY19.					
Title: Ballast Water Management	Articles:	2.700	1.736	1.836	0.000
Description: The National Invasive Species Act (NISA) requires the Secretary of Defense to implement a ballast water management program to minimize the risk of introduction of unwanted species and pathogens from releases of ballast water.		-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY19 to support Ballast Water Management tasking related to procurement and testing of Navy approved Ballast Water Treatment System (BWTS).						
FY 2018 Plans: <ul style="list-style-type: none"> - Perform assessments of emergent commercial off the shelf ballast water treatment systems that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. - Finalize full scale evaluation of two commercial ballast water treatment systems to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Initiate full scale evaluation of one commercial ballast water treatment system to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Perform pierside testing to address efficacy of ballast water exchange. - Determine ship services, consumables, manning required to run and maintain ballast water treatment systems. - Refine Navy ship installation guidance for meeting ballast water discharge standards considering damage control and stability requirements. - Develop ballast water treatment system acquisition strategy. 						
FY 2019 Base Plans: <ul style="list-style-type: none"> - Perform assessments of emergent commercial off the shelf ballast water treatment systems that would enable effective compliance at minimal life cycle cost and risk to operations. - Identify systems for detailed acquisition and evaluation. - Begin acquisition of a modified commercial ballast water treatment system for laboratory or pierside evaluation. - Continue full scale evaluation of one commercial ballast water treatment system to assess system performance, reliability, operability and maintainability, and suitability as a Navy shipboard system. - Determine ship services, consumables, manning required to run and maintain ballast water treatment systems. - Refine ballast water treatment system performance specification. 						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase in FY19 funding to support Ballast Water Management tasking related to procurement and testing of Navy approved BWTS.						
Title: Non-Copper Antifouling	Articles:	0.100	0.150	0.100	0.000	0.100

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Description: The copper discharges from underwater hull coatings remain a regulatory concern. The effort focuses on characterizing advanced coating systems and their suitability for Navy-unique operational factors such as speed time profiles, drydocking intervals, and maintenance practices.</p> <p>FY19 reflects completion of in-situ testing of antifouling coatings.</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Continue execution in-situ testing and provide periods reports on performance. - Evaluate NAVSEA screening and qualification test requirements for fouling release (with and without biocides) and antifouling coatings. - Identify gaps; develop and execute testing to fill gaps. - Compare results from historical qualification tests with full scale data plus Office of Naval Research (ONR) Intersite Calibration Study and Fouling Release Coating Study data. - Prepare final report with recommendations. - Draft qualification procedure modifications as needed. <p>FY 2019 Base Plans:</p> <ul style="list-style-type: none"> - Complete in-situ testing and provide final report on performance. - Complete evaluation of NAVSEA screening and qualification test requirements for fouling release (with and without biocides) and antifouling coatings. - Compare results from historical qualification tests with full scale data plus Office of Naval Research (ONR) Intersite Calibration Study and Fouling Release Coating Study data. - Finalize qualification procedure modifications as needed. <p>FY 2019 OCO Plans:</p> <p>N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>No significant changes from FY18 to FY19.</p>				
Accomplishments/Planned Programs Subtotals				8.191 7.920 7.776 0.000 7.776
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt
D. Acquisition Strategy RDT&E Contracts are Competitive Procurements.		
E. Performance Metrics Quarterly Program Reviews		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection					Project (Number/Name) 0401 / Shipboard Waste Mgmt					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Ancillary Hardware Development	Various	Misc. Contracts : Not Specified	19.149	0.000		0.000		0.000		-		0.000	0.000	19.149	Continuing
Primary Hardware Development	C/CPFF	Oceaneering : Not Specified	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	Continuing
Systems Engineering	C/CPFF	John J. McMullen & Son : Not Specified	4.487	0.000		0.000		0.000		-		0.000	0.000	4.487	Continuing
		Subtotal	24.636	0.000		0.000		0.000		-		0.000	0.000	24.636	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	SPAWAR : Charleston, SC	10.838	0.000		0.000		0.000		-		0.000	0.000	10.838	Continuing
		Subtotal	10.838	0.000		0.000		0.000		-		0.000	0.000	10.838	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	MIPR	US Army Corps of Engineers : Norfolk, VA	0.687	0.000		0.000		0.000		-		0.000	0.000	0.687	-
Developmental Test & Evaluation	WR	NSWCCD, Bethesda, MD : Bethesda, MD	208.432	6.234	Nov 2016	6.250	Nov 2017	6.800	Nov 2018	-		6.800	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWCIHD : Indian Head, MD	1.086	0.000		0.000		0.000		-		0.000	0.000	1.086	-
Developmental Test & Evaluation	WR	NRL,Wash,DC : Wash,DC	31.341	1.235	Nov 2016	0.948	Nov 2017	0.500	Nov 2018	-		0.500	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NSWCPD, Philadelphia, PA : Philadelphia, PA	0.000	0.472	Nov 2016	0.472	Nov 2017	0.301	Nov 2018	-		0.301	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 0401 / Shipboard Waste Mgmt								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation	WR	SPAWARSCEN : SD,CA	12.308	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
Developmental Test & Evaluation	WR	Misc. Govt Labs : TBD	22.975	0.250	Nov 2016	0.250	Nov 2017	0.175	Nov 2018	-		0.175	0.000	23.650	-	
Developmental Test & Evaluation	C/CPFF	SAIC : San Diego, CA	15.570	0.000		0.000		0.000		-		0.000	0.000	15.570	-	
Developmental Test & Evaluation	C/CPFF	Misc. Contracts : TBD	13.103	0.000		0.000		0.000		-		0.000	0.000	13.103	-	
Process Control Engineering	C/CPFF	M. Rosenblatt & Sons : Arlington, VA	6.547	0.000		0.000		0.000		-		0.000	0.000	6.547	Continuing	
Developmental Test & Evaluation	C/CPFF	ONR : Arlington, VA	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	Continuing	
Developmental Test & Evaluation	WR	Naval Postgraduate School : Monterey, CA	1.800	0.000		0.000		0.000		-		0.000	0.000	1.800	Continuing	
Process Control Engineering	MIPR	EPA, Hdqtrs : Washington, DC	0.840	0.000		0.000		0.000		-		0.000	0.000	0.840	Continuing	
Subtotal			315.089	8.191		7.920		7.776		-		7.776	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Travel	Allot	NAVSEA HQ : Washington, DC	0.375	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing	
SBIR Assessment	TBD	Not Specified : Not Specified	0.227	0.000		0.000		0.000		-		0.000	0.000	0.227	Continuing	
Subtotal			0.602	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				351.165	8.191		7.920		7.776		-		7.776	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy							Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection			Project (Number/Name) 0401 / Shipboard Waste Mgmt			
	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Remarks									

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity
1319 / 4**R-1 Program Element (Number/Name)**
PE 0603721N / Environmental Protection**Project (Number/Name)**
0401 / Shipboard Waste Mgmt**SHIPBOARD WASTE MANAGEMENT**

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1Q	2Q	3Q	4Q																								
Technical Authority																												
Liquid Wastes																												
Hazardous Material Control and Management																												
Ballast Water Management																												
Solid Waste Management																												
Non-Copper Antifouling																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0401 / Shipboard Waste Mgmt	
Schedule Details			
Events by Sub Project	Start	End	
	Quarter	Year	Quarter
SHIPBOARD WASTE MANAGEMENT			
Technical Authority	1	2017	4
Liquid Wastes	1	2017	4
Hazardous Material Control and Management	1	2017	4
Ballast Water Management	1	2017	4
Solid Waste Management	1	2017	4
Non-Copper Antifouling	1	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603721N / Environmental Protection				0817 / Environmental Sustainability Development (NESDI)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0817: Environmental Sustainability Development (NESDI)	44.352	5.600	4.782	4.266	-	4.266	4.439	6.120	6.237	6.358	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Inherent to the realization of the vision outlined in Sea Power 21 are certain environmental consequences that will, to a lesser or greater degree, be an impact on the Navy's ability to fully achieve the strategy outlined in the Navy Capability Pillars (NCP) SEA SHIELD, SEA STRIKE, SEA BASING and FORCEnet and the supporting initiatives of SEA WARRIOR, SEA TRIAL and SEA ENTERPRISE. Readiness and training are primary considerations for determining whether any fighting force is at its peak proficiency. The ability to train our forces in a realistic environment is paramount. Today's reality requires training and operating within environmental constraints (national and international laws and agreements), and searching for alternatives to comply with and alleviate those constraints. Moreover, as we develop new systems and technologies in support of Sea Power 21, the Navy must anticipate potential environmental regulations which, while not currently an issue, could in the future adversely impact our ability to protect and sustain our forces at home and abroad.

This program identifies pervasive Navy shore side environmental requirements and develops and validates information, new processes, and technologies that address requirements that pose significant impact on Naval shore activities in complying with environmental laws, regulations, orders, and policies. The goal of the program is to maximize opportunities for significant cost savings while minimizing personnel liabilities, operational costs, and regulatory oversight and preserving or enhancing the ability of Naval shore activities to accomplish their required missions and functions in support of the Navy's transformational strategy.

Environmental Enabling Capabilities -2 (EEC-2) MAXIMIZE TRAINING AND TESTING RANGE REQUIREMENTS WITHIN ENVIRONMENTAL CONSTRAINTS: This capability addresses environmental impacts and restrictions at Navy land and sea ranges, including munitions testing and manufacturing, to ensure Navy ranges are available to conduct required training and testing operations for the Fleet. Investments in EEC-2 provide validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs at Navy training and test ranges to maximize the availability and utilization of the ranges. The results support operational readiness by providing the tools and technologies necessary for sustaining and managing Navy land and sea ranges related to unexploded ordnance (UXO) and munitions, encroachment, air quality, airborne noise, water quality, and wetlands. Capabilities gained include the ability to assess and determine the risks from underwater UXO, the evaluation and prioritization of ordnance contaminated sites for evaluation in environmental programs and the implementation of range specific best management practices by evaluating and modeling available process, procedures, and technologies.

Environmental Enabling Capabilities-3 (EEC-3)PLATFORM MAINTENANCE AND REPAIR WITH MINIMAL ENVIRONMENTAL FOOTPRINT: This capability focuses on minimizing or eliminating environmental impact related to Navy and Marine Corps weapon system repair and maintenance operations. Investments in EEC-3 provide valid knowledge, models, processes, and technologies to minimize regulated emissions, discharges and hazardous material usage during the repair and maintenance of ships, submarines, and surface/sub-surface vehicles and aircraft and air vehicles. The program supports Fleet operational readiness and Navy acquisition communities by investing in information to understand emerging environmental requirements and to develop innovative processes and technologies that result in savings while

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)							
reducing the fleet environmental constraints related to platform maintenance. Capabilities and benefits gained include, but are not limited to, the reduction in the usage of heavy metals used in metal finishing (chromium and cadmium), reduced hazardous air pollutant (HAP) emissions, the development of best management practices and tools to minimize the use of hazardous materials, and the generation of hazardous wastes associated with maintaining and repairing ships, submarines, aircraft, and unmanned vehicles. Results of program investments will be leveraged across weapon system and platform acquisition to ensure continued reduction in lifecycle costs and long-term environmental compliance burdens to the Fleet.									
Environmental Enabling Capabilities-4 (EEC-4). SUPPORT SHORE READINESS WITHIN ENVIRONMENTAL CONSTRAINTS: Naval shore establishment requires the capability to operate and maintain facilities and provide waterfront and airfield services to the fleet while complying with applicable environmental regulations and minimizing environmental impacts and costs. The program invests in knowledge and innovative processes and technologies that minimize infrastructure and operational costs, regulated emissions, while minimizing discharges and hazardous material usage from ship (waterfront) and aviation operations. Capabilities and benefits gained under EEC-4 include, reduced costs associated with wastewater treatment, elimination/reduction in the use of HAPs, ozone depleting substances (ODSs), volatile organic compounds (VOCs) and the associated reporting requirements, reduced hazardous waste and disposal costs, and improved storm water management.									
Environmental Enabling Capabilities-5 (EEC-5). COST-EFFECTIVE MANAGEMENT OF ENVIRONMENTAL REGULATORY REQUIREMENTS: The environmental compliance regulations require base managers to permit, monitor and report on many processes associated with weapon system and platform operations. Naval shore environmental managers require the capability to efficiently and cost effectively manage these compliance requirements. Under EEC-5, the program invests in improved data collection, methods, and models to assess environmental impacts and ecological risk assessments of Naval Operations on harbors, U.S. waterways, and surrounding communities. Benefits include gaining standardized technical environmental management improvements/techniques related to source control, assessment, and monitoring. EEC-5 also provides validated knowledge, models, processes and technologies to improve environmental monitoring and reporting, and to reduce the cost of compliance with regulations applicable to coastal contamination and contaminated sediments.									
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Title: Maximize Training & Testing Requirements Within Environmental Constraints	Articles:	1.095	0.850	0.735	0.000	0.735			
FY 2018 Plans: FY18 funds will be applied to: - Continue providing validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges. - Continue the following initiatives: X-ray inspection system to demilitarize targets; Analysis of the Long-Term Fate of Munitions Constituents on Terrestrial Sites. - Complete the initiative: Underwater low environmental impact munitions breaching technology to better characterize environmental impacts of munitions on training ranges and munitions response sites.		-	-	-	-	-			
FY 2019 Base Plans: FY 2019 Base Plans:									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none"> - Continue providing validated knowledge, models, and processes to mitigate environmental impacts, restrictions, and costs of Navy training and test ranges to maximize the availability and utilization of the ranges. - Continue the initiative: Analysis of the Long-Term Fate of Munitions Constituents on Terrestrial Sites. - Complete the initiatives: X-ray inspection system to demilitarize targets. - Program to begin to evaluate Cost Effective Main Charge Remediation of Insensitive Munitions for Range Clearance. 						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant changes from FY18 to FY19.						
Title: Platform Maintenance and Repair With Minimal Environmental Footprint Articles:		1.130	1.064	1.007	0.000	1.007
FY 2018 Plans: FY18 funds will be applied to: <ul style="list-style-type: none"> - Continue evaluations and demonstrations of innovative solutions for difficult and persistent aviation and shipyard platform sustainment issues related to hexavalent chrome, cadmium, volatile organic compounds (VOC) hazardous air pollutants (HAP) and other hazardous compounds at Naval Aviation Systems Command Fleet Readiness Centers and the Navy's shipyards. - Complete the initiatives: Advanced Non-Chromate Primers and Coatings, Portable Treatment for Ship Material Removal Processes, Low-VOC and Low-HAP Wipe Solvent and Paint Thinner Demonstration/Validation. 						
FY 2019 Base Plans: FY 2019 Base Plans: <ul style="list-style-type: none"> - Continue providing innovative solutions for difficult and persistent shipyard environmental compliance issues. - Continue the initiatives: Demonstration Of Non-Chromated Adhesive Bond Primer For Metal Repair Bonding, Non-Isocyanate Polyurethane-Free Formulation Coatings for Aircraft and Support Equipment, Multi-Functional Surface Preparation Technology for Maintenance Painting, Demonstration of Optimized non-NMP (n-Methyl-2-pyrrolidone) Solvents for Immersion Chemical Depainting, Initiation Decision Report of Laser Coating Removal on Naval Aircraft Components, Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers, Low VOC Primers for Ground Support Equipment Application. 						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none"> - Complete the initiatives: User Friendly Oxygen Cleaning Alternatives to Navy Oxygen Cleaning (NOC), Enhanced Trivalent Chromium Pretreatment for Improved Coloration and Corrosion Performance of Aluminum Substrates, Naval Air Systems Command Solutions for Engine Washing. - Program to begin to examine Electromagnetic Interference Shielding Tape, Replacement of Cadmium in GSE Avionics Applications. <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: No significant changes from FY18 to FY19.</p>							
<p>Title: Support Shore Readiness within Environmental Constraints</p> <p>Articles:</p> <p>FY 2018 Plans: FY18 funds will be applied to:</p> <ul style="list-style-type: none"> - Continue evaluations and demonstrations of innovative solutions to minimize regulated emissions, discharges and hazardous material usage resulting specifically from waterfront support, aviation support, and other base operations. - Continue the initiatives: Analysis of Regulated Garbage Management Processes to Ensure Compliance with Animal and Plant Health Inspection Service Regulations, Evaluation and Implementation of Compliance Options for National Pollutant Discharge Elimination System (NPDES) Cooling Water Intake Structures at Existing Facilities, Quantification of Polychlorinated Biphenyls (PCB) Paint Volatilization, Demonstration of New Strategies for Enhanced Monitored Natural Recovery at Navy Sediment Sites, Diver-less Deployment System for In-Situ Sediment Samplers, Improved Dewatering of Dredged Sediment, NPDES Copper Effluent Control System. - Complete the initiatives: Surface Cleaning of Drydock Floors, Dry Dock Sediment Management. <p>FY 2019 Base Plans: FY 2019 Base Plans:</p> <ul style="list-style-type: none"> - Continue the initiatives: Demonstration of New Strategies for Enhanced Monitored Natural Recovery at Navy Sediment Sites, Improved Dewatering of Dredged Sediment, NPDES Copper Effluent Control System. - Continue optimization of ship to shore regulated garbage management, improved dewatering of dredge sediment and demonstration of new strategies for enhanced monitored natural recovery at Navy sediment sites. 	1.505	1.187	1.039	0.000	1.039		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Complete the initiatives: Analysis of Regulated Garbage Management Processes to Ensure Compliance with Animal and Plant Health Inspection Service Regulations, Evaluation and Implementation of Compliance Options for NPDES Cooling Water Intake Structures at Existing Facilities, Quantification of Polychlorinated Biphenyls (PCB) Paint Volatilization, Diver-less Deployment System for In-Situ Sediment Samplers. - Under Pier Sediment Pile Assessment Tools to be evaluated and started.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY18 to FY19.						
Title: Cost-Effective Management of Environmental Regulatory Requirements FY 2018 Plans: FY18 funds will be applied to: - Continue providing validated knowledge, models, processes and systems to improve environmental monitoring and reporting, and reduce the cost of compliance with regulations and management of coastal contamination and contaminated sediments. - Continue the initiatives: Evaluation of Alternative Groundwater Supply Sources from a Safe Drinking Water Act Viewpoint, Stable Carbon Isotopes for Tracing in situ Royal Demolition eXplosive (RDX) Remediation, Superhydrophobic Coating for Corrosion Prevention and Leachate Impedance, Forward Looking Infrared Camera for Advanced Discharge Characterization, Smart Electronic Tools for Navy Environmental Compliance Monitoring and Reporting, Utility Vault Water Treatment, Preventative Management of Contaminated Silt, Using Stable-Isotope Labeled Tracers to Validate Natural Attenuation of RDX in Groundwater, In Situ Treatment of 1,4-Dioxane using Enhanced Biodegradation, Demonstration of Improved Toxicity Methodology to Link Stormwater Discharges to Receiving Water Impacts, Sewer Gas Elimination Technology, Impact of Sediment Resuspension by Propeller Wash and Shore Sediment Dynamics on Remediation Options, Study of Waste Management and Minimization for Aqueous Film Forming Foam (AFFF) Wastewater, Addressing Temporal Variability in Industrial Buildings during Vapor Intrusion Assessments, Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl (PFOS/PFOA) Substances from Groundwater, Enterprise-wide Hazardous Material Standardization and Minimization of General Use Consumables, In-situ Automatic Stormwater Sampling Device for Use at Tidally Impacted Sampling Locations, Background analysis and tracer study to identify metal contaminant source contributions to stormwater runoff, Biochar Adsorption	Articles: 1.870	1.681	1.485	0.000	1.485	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection		Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
for Dry Dock Effluent, Development and Demonstration of a Portable, Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal, Implementation of Biotic Ligand Model-Based Water Quality Standards for Copper at Navy Sites, Source Metal Particle Removal for Stormwater Compliance, Business Processes and Requirements Enabling Technology Integration. - Complete the initiatives: Initiation Decision Report Passive Sampling for Stormwater, A Comprehensive Analysis and Strategy for Contaminated Sediment Management.					
FY 2019 Base Plans: FY 2019 Base Plans: - Complete the initiatives: Forward Looking Infrared Camera for Advanced Discharge Characterization, Smart Electronic Tools for Navy Environmental Compliance Monitoring and Reporting, Study of Waste Management and Minimization for AFFF Wastewater. - New program evaluate and demonstration/validation of Air Filtration for Indoor Air Quality, Stormwater Piping-Based Pollutant Best Management Practice, Improving Site Closure Decision-Making with Time-Integrated Groundwater Samples.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: No significant changes from FY18 to FY19.					
Accomplishments/Planned Programs Subtotals					5.600 4.782 4.266 0.000 4.266
C. Other Program Funding Summary (\$ in Millions)					
N/A					
Remarks					
D. Acquisition Strategy This project is categorized as Non-ACAT (Non Acquisition). The project delivers a broad spectrum of products that require a variety of acquisition processes to implement. Equipment products for naval stations and other mission funded activities are often procured directly through the base operating budget. Equipment products for Shipyards and other Navy Working Capital Fund (NWCF) activities costing over \$250K are procured through their Capital Investment Program (CIP). For both types of activities, equipment products costing less than \$250K, and process changes not requiring the purchase of new equipment such as consumable material or product substitutions, are funded through the activity's operating budgets. Occasionally there is a technology that must be implemented as a specialized facility. These are acquired through the Military Construction (MILCON) Program. All these acquisition processes are pursued using a common strategy that satisfies the needs of all					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / <i>Environmental Protection</i>	Project (Number/Name) 0817 / <i>Environmental Sustainability Development (NESDI)</i>
the critical stakeholders: 1) fleet end user; 2) funding sponsor for the Navy end user; 3) other stakeholders with cognizance over the Navy process or operation being changed, 4) cognizant environmental federal, state, and local regulators; and 5) the private or government organization that will produce the product.		
E. Performance Metrics Quarterly Budget Reviews		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC 2	Various	EXWC : PT HUENEME, CA	5.585	0.740	Oct 2016	0.500	Oct 2017	0.410	Oct 2018	-		0.410	Continuing	Continuing	Continuing
EEC 2	Various	SSC : SAN DIEGO, CA	5.549	0.355	Oct 2016	0.350	Dec 2017	0.325	Dec 2018	-		0.325	Continuing	Continuing	Continuing
EEC 3	WR	NAWC : PATUXENT RIVER, MD	1.916	0.175	Jul 2017	0.202	Mar 2018	0.135	Mar 2019	-		0.135	Continuing	Continuing	Continuing
EEC 3	Various	NSWC : BETHESDA, MD	3.630	0.220	May 2017	0.192	Nov 2017	0.175	Feb 2019	-		0.175	Continuing	Continuing	Continuing
EEC 3b	Various	EXWC : PT HUENEME, CA	1.307	0.105	May 2017	0.050	Mar 2018	0.077	Mar 2019	-		0.077	Continuing	Continuing	Continuing
EEC 4	Various	EXWC : PT HUENEME, CA	7.780	0.600	Mar 2017	0.540	Mar 2018	0.404	Mar 2019	-		0.404	Continuing	Continuing	Continuing
EEC 4	Various	NSWC : BETHESDA, MD	3.813	0.575	Oct 2016	0.307	Nov 2017	0.260	Nov 2018	-		0.260	Continuing	Continuing	Continuing
EEC 4a	Various	SSC : SAN DIEGO, CA	3.235	0.330	Jan 2017	0.340	Jan 2018	0.375	Apr 2019	-		0.375	Continuing	Continuing	Continuing
EEC 5	Various	EXWC : PT HUENEME, CA	2.986	0.590	Jan 2017	0.535	Nov 2017	0.433	Nov 2018	-		0.433	Continuing	Continuing	Continuing
EEC 5	Various	SSC : SAN DIEGO, CA	1.540	0.270	Feb 2017	0.395	Feb 2018	0.350	Feb 2019	-		0.350	Continuing	Continuing	Continuing
EEC 5	Various	NAWC : PATUXENT RIVER, MD	1.187	0.140	Jun 2017	0.050	Jun 2018	0.100	Jun 2019	-		0.100	Continuing	Continuing	Continuing
EEC 5	Various	NSWC : BETHESDA, MD	1.750	0.540	Jan 2017	0.504	Jan 2018	0.387	Jan 2019	-		0.387	Continuing	Continuing	Continuing
EEC 5	WR	NAWCWD : CHINA LAKE, CA	1.145	0.215	Oct 2016	0.122	Dec 2017	0.140	Dec 2018	-		0.140	Continuing	Continuing	Continuing
EEC 5	WR	NAWC : LAKE HURST, NJ	0.716	0.115	Nov 2016	0.075	Nov 2017	0.075	Nov 2018	-		0.075	Continuing	Continuing	Continuing
EEC 3	WR	FRC - SE : JACKSONVILLE, FL	1.305	0.380	Feb 2017	0.380	May 2018	0.380	May 2019	-		0.380	Continuing	Continuing	Continuing
EEC 3	Various	NSWC : San Diego, CA	0.000	0.060	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
EEC 3	WR	FRC - CE : Cherry Point, NC	0.320	0.060	Jun 2017	0.075	Jun 2018	0.075	Jun 2019	-		0.075	Continuing	Continuing	Continuing
EEC 3	Various	FRC-SW : San Diego, CA	0.588	0.130	Mar 2017	0.165	Mar 2018	0.165	Mar 2019	-		0.165	Continuing	Continuing	Continuing
Subtotal		44.352	5.600		4.782		4.266		-			4.266	Continuing	Continuing	N/A
Remarks				Performing Activities: Naval Surface Warfare Center, Carderock Division (NSWC/CD); Engineering and Expeditionary Warfare Center (EXWC), Port Hueneme, CA; Naval Surface Warfare Center, Indian Head Division (NSWC/IH); Space and Warfare Systems Center, San Diego (SSC/SD); Naval Air Warfare Center Aircraft Division Patuxent River (NAWCAD/PAX); Naval Air Warfare Center (NAWCWD/China Lake); Naval Air Warfare Center Aircraft Division Lakehurst (NAWCAD/Lakehurst); Fleet Readiness Center Southeast, Jacksonville FL (FRC-SE); Fleet Readiness Center Southwest, San Diego (FRC-SW), Fleet Readiness Center East, Cherry Point (FRC-CE). Total Prior Years Cost: Subtotal does not include performing activities from prior years that are no longer performing activities. Award Dates: About 55% of the project is executed via contracts awarded by the performing activities.											
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			44.352	5.600		4.782		4.266		-		4.266	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0603721N / Environmental Protection					0817 / Environmental Sustainability Development (NESDI)											
FY 2017 FY 2018 FY 2019 FY 2020 FY 2021 FY 2022 FY 2023																					
Proj 0817		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EEC 2																					
EEC 3																					
EEC 4																					
EEC 5																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 0817 / Environmental Sustainability Development (NESDI)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0817				
EEC 2	1	2017	4	2022
EEC 3	1	2017	4	2022
EEC 4	1	2017	4	2022
EEC 5	1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 9204 / Marine Mammal Research				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9204: Marine Mammal Research	46.769	5.326	4.512	4.769	-	4.769	4.905	5.298	5.404	5.507	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Navy has been and will continue to be subject to litigation with regard to the potential injuring, killing or biologically significant disturbance of marine animals by the use of intense underwater sound. Since Fleet operation and training areas coincide with known or probable habitats, migration routes, or breeding areas of marine mammals and other protected marine species, the possibility exists that such incidents are likely to continue in the future. The increasing public interest and pressure has resulted in escalating Fleet costs. For example, Fleet and SYSCOM development activities have been interrupted; modified, or altogether cancelled and environmental regulations have, among other things, required new ship construction shock trials to obtain Federal permits and conduct extensive environmental planning that can take several years to complete. The incorporation of mitigation measures in Fleet training operations to minimize the potential adverse effects on protected marine animals can significantly reduce the realism of these operations. In addition, the testing, evaluation, and deployment of new sonar detection and monitoring systems that use active acoustics are under intense public scrutiny for their potential adverse effects on whales and other marine mammals. Navy needs scientific evidence to substantiate its claims of limited or inconsequential adverse effects to marine life from operations.

This project primarily focuses on the development of planning, monitoring, and mitigating tools to aid the Fleet in minimizing contact with and the potential harassment of protected marine animals during operations, exercises, training, and undersea surveillance and weapons testing. These new capabilities will encompass historical and newly acquired data and analytical models that together can predict marine animal habitats (where they are likely to be), and their natural and expected behavior (diving patterns, prey localization, calling activity, etc.). This project consists of three major areas that will help ensure Navy compliance with the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA).

These areas are (1) Marine Ecology and Population Dynamics - determine the likelihood of the presence of marine mammals or other protected species by developing habitat and ecological models. Refine marine animal survey techniques to optimize the accuracy of abundance estimates in small ocean regions of Navy interest.

(2) Criteria, Thresholds, and Mitigation - Establish criteria and thresholds from which to measure potential impact on marine mammals and other marine species from Navy training operations. Determine the effectiveness and usefulness of various mitigation measures in relation to the potential impact of Navy operations on marine mammals; and (3) Mitigation Methodologies - Determine the observation, detection and classification measures required to develop effective monitoring and mitigation procedures for Fleet and SYSCOM use. Focus on improving marine animal monitoring capabilities over current methods by developing new technologies or improving existing technologies that improve monitoring and mitigation effectiveness, reduce cost and minimize impacts on readiness activities.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Marine Ecology and Population Dynamics	0.871	0.815	0.900	0.000	0.900
FY 2018 Plans:	Articles: -	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 9204 / Marine Mammal Research				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue ongoing research on the topics of density estimation from passive acoustic monitoring, development of tools for acoustic-only behavioral response studies, and standards/metrics development. Ongoing work on the topic of density estimation from passive acoustic monitoring is focused on the fieldwork/data collection stage in FY 2018. The ongoing work on the topic of standards/metrics development is focused on continued development of the proposed passive acoustic monitoring metadata database system.	Three studies are expected to be completed in FY2018: -Developing tools for acoustic-only behavioral response studies at Navy instrumented ranges, -Standardization of auditory evoked potential audiometry methods to ensure comparable data inclusion in a national database, and -Acoustical Society of America (ASA) standard on towed passive acoustic systems. One study was initiated in FY2018 in response to a need to develop an automated sonar detector in order to establish consistency amongst projects analyzing passive acoustic data for potential impacts from the use of sonar.					
FY 2019 Base Plans: Continue ongoing research on the topics of density estimation from passive acoustic monitoring, standards/metrics development, and development of an automated sonar detector. Ongoing work on the topic of density estimation from passive acoustic monitoring are in the height of the fieldwork/data collection stage in FY2019. The ongoing work on the topic of standards/metrics development is now in the second half of the project and should be focused on refinements/testing of the passive acoustic monitoring metadata database system and standards development. The ongoing work to develop an automated sonar detector will be focused on comparing available detectors to determine which one is performing the best. None of the ongoing studies in these topic areas are scheduled to be completed in FY2019.	One study is expected to be initiated in FY2019 in response to a need to collect data on potential impacts to coral from Navy activities. In addition, based on feedback from the Fleets and SYSCOMS, there is a need for continued investment in passive acoustic data analysis tools in FY2019.					
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 9204 / Marine Mammal Research				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
No significant changes from FY18 to FY19.						
Title: Criteria and Thresholds, Physiology and Behavior, and Effects of Sound	Articles:	2.732	2.486	2.654	0.000	2.654
FY 2018 Plans: Continue ongoing research on the topics of hearing (in birds, monk seals, harbor porpoise), temporary threshold shift (in harbor porpoises and bottlenose dolphins), effects on fish from underwater explosions, and behavioral response studies (beaked whales, fin whales, sperm whales). Ongoing studies in these topic areas are all in the middle of the data collection/fieldwork stage in FY2018. Two studies are expected to be completed in FY2018: -Hawaiian monk seal auditory hearing study. -Blainville's beaked whale behavioral risk function for Hawaiian populations.		-	-	-	-	-
Two studies were initiated in FY2018 in response to a need to collect in-situ explosive sound characterization and propagation data and harbor seal hearing and temporary threshold shift. Funding in these topic areas is particularly important because the results are needed by early 2020 to update the criteria and thresholds for the Phase IV acoustic effects modeling.						
FY 2019 Base Plans: Continue ongoing research on the topics of hearing (in birds, harbor porpoises and harbor seals), temporary threshold shift (in harbor porpoises and harbor seals), effects on fish from underwater explosions, behavioral response studies (beaked whales, fin whales, sperm whales), and in-situ explosive sound and propagation characterization. Most ongoing studies are in the middle of the data collection/fieldwork stage in FY2019, but two projects are the final data analysis and report writing stage. Two studies are expected to be completed in FY2019: -Frequency-dependent growth and recovery of temporary threshold shift in bottlenose dolphins, and -Temporary threshold shift in harbor porpoises due to naval sonar sounds and recovering of hearing.						
Funding in this topic area is particularly important because the results are needed by the end of 2020 to update the criteria and thresholds for the Phase IV acoustic effects modeling. If emergent needs are identified in FY2018, then they would need to be funded in late FY2018/early 2019 to meet the 2020 goal.						
FY 2019 OCO Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018					
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 9204 / Marine Mammal Research						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
N/A									
FY 2018 to FY 2019 Increase/Decrease Statement: The increase in funding from FY18 to FY19 can be attributed to the study on in-situ explosive sound and propagation characterization ramping up into the fieldwork/testing phase in FY19.									
Title: Mitigation Methodologies: Monitoring, New Technology, and Risk Assess				Articles:	1.723	1.211	1.215	0.000	1.215
FY 2018 Plans: Continue ongoing research on passive acoustic monitoring technology, tagging demonstrations, and development of the M3R (Marine Mammal Monitoring on Navy Ranges) system. All ongoing efforts are in the data collection/fieldwork phase and in some cases are in the analysis phase.					-	-	-	-	-
Three studies are expected to be completed in FY2018: -Integrated Real-Time Autonomous Passive Acoustic Monitoring (IRAP) System, -Extended duration acoustic tagging of right whales, and -High fidelity acoustic and fine-scale movement tags to enable behavioral response research on deep diving whales.									
Once the existing projects are completed and an analysis of the status of the research is conducted, then new needs will be identified in FY2018 for follow-on research.									
FY 2019 Base Plans: Continue ongoing research on monitoring technology and development of the M3R (Marine Mammal Monitoring on Navy Ranges) system.									
None of the ongoing studies are scheduled to be completed in FY2019.									
After an analysis of the status of the passive acoustic monitoring technologies and tagging demonstrations are complete, it is anticipated that there will be a need to fund follow-on efforts in FY 2019.									
FY 2019 OCO Plans: N/A									
FY 2018 to FY 2019 Increase/Decrease Statement:									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 9204 / Marine Mammal Research	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
No significant change from FY18 to FY19.		FY 2017	FY 2018	FY 2019 Base
Accomplishments/Planned Programs Subtotals				FY 2019 OCO
				FY 2019 Total
				5.326 4.512 4.769 0.000 4.769
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy RDTEN Contracts are Competitive Procurements.				
E. Performance Metrics Quarterly Program Reviews				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection					Project (Number/Name) 9204 / Marine Mammal Research					
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Mar Ecol & Pop Dynamics	Various	EXWC : Port Hueneme, CA	1.872	0.550	Oct 2016	0.555	Nov 2017	0.745	Oct 2018	-		0.745	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	NMMF : San Diego, CA	0.000	0.135	Oct 2016	0.049	Nov 2017	0.000		-		0.000	0.000	0.184	-
Mitigation Methods	SS/CPFF	SDSU : San Diego, CA	0.000	0.216	Oct 2016	0.358	Nov 2017	0.000		-		0.000	0.000	0.574	-
Criteria & Thresholds	SS/CPFF	SEAMARCO : Netherlands	0.000	0.276	Oct 2016	0.040	Nov 2017	0.000		-		0.000	0.000	0.316	-
Mitigation Methods	WR	OASIS Technologies, Inc. : Lexington, MA	1.110	0.228	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	U Saint Andrews : United Kingdom	0.000	0.163	Oct 2016	0.343	Nov 2017	0.400	Oct 2018	-		0.400	0.000	0.906	-
Mitigation Methods	SS/CPFF	Biowaves : San Diego, CA	0.000	0.139	Oct 2016	0.000		0.000		-		0.000	0.000	0.139	-
Mitigation Methods	SS/CPFF	Syracuse U : Syracuse, NY	0.000	0.000		0.030	Nov 2017	0.000		-		0.000	0.000	0.030	-
Criteria & Thresholds	SS/CPFF	WHOI : Falmouth, MA	0.000	0.000		0.138	Nov 2017	0.200	Oct 2018	-		0.200	0.000	0.338	-
Mitigation Methods	WR	SPAWAR : San Diego, CA	0.861	0.127	Jan 2017	0.085	Nov 2017	0.100	Oct 2018	-		0.100	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	MARECOTEL : Seabeck, WA	0.000	0.000		0.560	Nov 2017	0.600	Oct 2018	-		0.600	0.000	1.160	-
Mitigation Methods	SS/CPFF	Scripps Institute : San Diego, CA	0.500	0.251	Jan 2017	0.297	Nov 2017	0.200	Oct 2018	-		0.200	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	U Washington : Seattle, WA	0.000	0.000		0.403	Nov 2017	0.300	Oct 2018	-		0.300	0.000	0.703	-
Mitigation Methods	SS/CPFF	Oregon State Univ : OR & HI	0.606	0.148	Jan 2017	0.055	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	Various	EXWC : Port Hueneme, CA	0.000	0.000		0.647	Jan 2018	0.651	Jan 2019	-		0.651	0.000	1.298	-
Mar Ecol & Pop Dynamics	WR	NAVAIR : Lakehurst, NJ	0.302	0.075	Oct 2016	0.130	Nov 2017	0.075	Oct 2018	-		0.075	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 9204 / Marine Mammal Research							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Mitigan Methods	Various	EXWC : Port Hueneme, CA	0.000	0.000		0.183	Jan 2018	0.515	Jan 2019	-		0.515	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	SS/CPFF	BMC Inc. : Chicago, IL	0.290	0.151	Jan 2017	0.100	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Mitigation Methods	WR	NUWC : Newport, RI	10.043	0.614	Jan 2017	0.194	Nov 2017	0.400	Oct 2018	-		0.400	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	WR	NPGS : Monterey, CA	3.549	0.030	Oct 2016	0.030	Nov 2017	0.030	Oct 2018	-		0.030	Continuing	Continuing	Continuing
Mar Ecol & Pop Dynamics	MIPR	NOAA: Various : La Jolla, CA	3.446	0.065	Jan 2017	0.000		0.050	Oct 2018	-		0.050	Continuing	Continuing	Continuing
Mitigation Methods	SS/CPFF	Scripps Institute : La Jolla, CA	9.715	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Mitigation Methods	SS/CPFF	Oregon State Univ. : Corvallis, OR	2.066	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.100	Oct 2018	-		0.100	0.000	0.100	-
Criteria & Thresholds	SS/CPFF	SPAWAR : San Diego, CA	3.775	0.000		0.315	Nov 2017	0.403	Oct 2018	-		0.403	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	Cascadia Research Collective : Olympia, WA	6.390	1.859	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Criteria & Thresholds	SS/CPFF	San Diego State Univ : San Diego, CA	2.244	0.299	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			46.769	5.326		4.512		4.769		-		4.769	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			46.769	5.326		4.512		4.769		-		4.769	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection								Project (Number/Name) 9204 / Marine Mammal Research							
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
MARINE MAMMAL RESEARCH																			
Marine Mammal Ecology and Population Dynamics																			
Criteria and Thresholds, Physiology and Behavior, and Effects of Sound																			
Mitigation Methodologies: Monitoring, New Technology, and Risk Assessment																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection		Project (Number/Name) 9204 / Marine Mammal Research	
Schedule Details					
Events by Sub Project		Start		End	
MARINE MAMMAL RESEARCH		Quarter	Year	Quarter	Year
Marine Mammal Ecology and Population Dynamics		1	2017	4	2022
Criteria and Thresholds, Physiology and Behavior, and Effects of Sound		1	2017	4	2022
Mitigation Methodologies: Monitoring, New Technology, and Risk Assessment		1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 9205 / Marine Mammal Settlement				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9205: <i>Marine Mammal Settlement</i>		0.000	0.000	3.000	3.000	-	3.000	3.000	0.000	0.000	0.000	9.000	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification													
The Navy developed the Surveillance Towed Array Sensory System (SURTASS) Low Frequency Active (LFA) sonar system to meet the requirement for improved capability to detect quieter and harder to find foreign submarines at greater distances. The Navy employs SURTASS LFA systems onboard up to four U.S. Navy surveillance ships for routine training, testing, and military operations in the Atlantic, Pacific, and Indian Oceans and the Mediterranean Sea. Employment of these systems has been the subject of litigation over the last two decades. The U.S. Navy, the National Oceanic and Atmospheric Administration (NOAA), and the Natural Resources Defense Council et al. entered into a settlement agreement, which has been filed with the U.S. District Court for the Northern District of California, to resolve claims alleged by the plaintiffs that the Navy and NOAA violated the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the National Environmental Policy Act (NEPA). The purpose of this funding is to comply with the terms of the settlement agreement filed with the court. Under the terms of the settlement, the Navy agrees to spend \$9M over the course of three years from fiscal year 2018 through 2020 to fund research projects within the following research topic areas: 1) Developing capacity to protect acoustic habitats, including in national marine sanctuaries managed under the National Marine Sanctuaries Act 16 U.S.C. 1431 et seq., and high-risk areas for protected species; 2) improve marine mammal density and distribution modeling in data poor areas to assist with the identification of areas of biological importance; and 3) density data collection. Funding of this research will ensure compliance with the settlement agreement and will ensure that SURTASS training, testing and operational activities are able to proceed without interruption.													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
Title: MARINE MAMMAL SETTLEMENT										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
<i>Articles:</i>										0.000	3.000	3.000	0.000
FY 2018 Plans:										-	-	-	-
Work in FY2018 will be focused on overall planning, getting the Inter-agency Agreement (IAA) set up with NOAA, and setting up funding for all associated partners. The majority of work conducted in FY2018 will be prioritized under topic areas 1) "Developing capacity to protect acoustic habitats, including in national marine sanctuaries managed under the National Marine Sanctuaries Act 16 U.S.C. 1431 et seq., and high-risk areas for protected species" and 2) "Improving marine mammal density and distribution modeling in data-poor areas".													
Work under topic area 1 will be focused on finalizing soundscape monitoring plans, holding a soundscape workshop with international experts, purchasing equipment, and preparing for fieldwork in FY2019. Work under													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 9205 / Marine Mammal Settlement				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
topic area 2 will be focused on holding a workshop and collaborating with the workgroup experts on priority research areas to advance density spatial modeling methods among federal agencies.						
FY 2019 Base Plans: Work in FY2019 under topic area 1 will be focused on conducting soundscape monitoring and fieldwork within National Marine Sanctuaries on the East Coast, West Coast, and Hawaii. This will include deployment and maintenance of passive acoustic monitoring equipment, gliders, telemetry stations; organization and communication regarding analysis techniques; and potentially some initial analysis of data collected. Work under topic area 2 will be focused on holding a follow-up workshop and continuing to collaborate with the workgroup experts on priority research areas to advance density spatial modeling methods among federal agencies. Work under topic area 3 will include planning for what experts will be included in the workgroup and for the elicitation process that will occur in FY2020.						
FY 2019 OCO Plans: N/A						
	Accomplishments/Planned Programs Subtotals	0.000	3.000	3.000	0.000	3.000
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
RDTEN Contracts are Competitive Procurements.						
E. Performance Metrics						
Quarterly Program Reviews						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection				Project (Number/Name) 9205 / Marine Mammal Settlement						
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SURTASS	MIPR	NOAA, HQ : Silver Spring, MD	0.000	0.000		2.500	Oct 2017	2.500	Oct 2018	-		2.500	0.000	5.000	-
SURTASS	WR	EXWC : Port Hueneme, CA	0.000	0.000		0.500	Oct 2017	0.500	Oct 2018	-		0.500	0.000	1.000	-
Subtotal		0.000	0.000		3.000		3.000		-			3.000	0.000	6.000	N/A
Remarks Annual funding in the amount of \$3M are required to comply with the settlement. Funding will likely be disbursed as indicated below and all monies are required in the 1st Quarter of the Fiscal Year (Oct 1 2017).															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		3.000		3.000		-		3.000	0.000	6.000	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018	
Appropriation/Budget Activity				R-1 Program Element (Number/Name)								Project (Number/Name)					
1319 / 4				PE 0603721N / Environmental Protection								9205 / Marine Mammal Settlement					
				FY 2017				FY 2018				FY 2019				FY 2020	
				1	2	3	4	1	2	3	4	1	2	3	4	1	
Proj 9205				2	3	4	1	2	3	4	1	2	3	4	1	2	
SURTASS Marine Mammal Settlement:				SURTASS Marine Mammal Settlement													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603721N / Environmental Protection	Project (Number/Name) 9205 / Marine Mammal Settlement	
Schedule Details			
Events by Sub Project		Start	End
Quarter	Year	Quarter	Year
Proj 9205			
SURTASS Marine Mammal Settlement: SURTASS Marine Mammal Settlement	1	2018	4
			2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603724N / Navy Energy Program								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	325.796	69.500	25.623	25.656	-	25.656	26.452	26.991	27.513	28.094	Continuing	Continuing	
0829: ENERGY CONSERVATION (ADV)	67.683	9.597	5.471	5.489	-	5.489	5.643	5.761	5.876	6.000	Continuing	Continuing	
0838: Mobility Fuels (ADV)	79.053	12.774	7.928	7.921	-	7.921	8.194	8.363	8.516	8.707	Continuing	Continuing	
0928: Shore Energy Technology	50.252	1.957	1.800	1.704	-	1.704	1.859	1.898	1.936	1.976	Continuing	Continuing	
0996: Aircraft Energy Conservation	116.739	25.829	10.424	10.542	-	10.542	10.756	10.969	11.185	11.411	Continuing	Continuing	
9999: Congressional Adds	12.069	19.343	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	31.412	

A. Mission Description and Budget Item Justification

This program supports projects to evaluate, adapt, and demonstrate energy related technologies for Navy aircraft and ship operations to: (a) increase fuel-related weapons systems capabilities such as range and time on station; (b) reduce energy costs; (c) apply energy technologies that improve environmental compliance; (d) examine restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. This program supports the achievement of legislated, White House, Department of Defense, and Navy energy management goals.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	27.479	50.623	51.385	-	51.385
Current President's Budget	69.500	25.623	25.656	-	25.656
Total Adjustments	42.021	-25.000	-25.729	-	-25.729
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.379	0.000			
• Program Adjustments	25.000	-25.000	-25.200	-	-25.200
• Rate/Misc Adjustments	0.000	0.000	-0.529	-	-0.529

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603724N / Navy Energy Program			
• Congressional Directed Reductions	-1.600	-	-	-	-
Adjustments					
• Congressional Add Adjustments	20.000	-	-	-	-
Congressional Add Details (\$ in Millions, and Includes General Reductions)					
Project: 9999: Congressional Adds					
Congressional Add: Installation Energy Efficiency Enhancements					
Congressional Add: Program Increase: Renewable Energy Development					
Congressional Add Subtotals for Project: 9999					
Congressional Add Totals for all Projects					
		FY 2017	FY 2018		
		4.836	0.000		
		14.507	0.000		
		19.343	0.000		
		19.343	0.000		

Change Summary Explanation

Schedule:

0838 - Fuel Quality/Develop Operational and Laboratory Techniques was added from 1Q FY18 through 4Q FY22 to improve/reduce cost of Naval tactical fuel quality analysis.

Technical: Not applicable.

The funding decreases in FY 2018 and FY 2019 reflect a shift in Department of the Navy (DoN) priorities and an urgent requirement to address emergent, critical unfunded requirements in FY 2018. The decrease aligns Energy program funding to the previous amounts executed prior to FY 2011.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0829: ENERGY CONSERVATION (ADV)	67.683	9.597	5.471	5.489	-	5.489	5.643	5.761	5.876	6.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Energy Conversation Advanced Project is designed to develop and implement energy and maintenance saving improvements into existing Fleet assets. This energy conservation project, managed through NAVSEA 05T, will identify mature potential energy saving areas, by involvement with Fleet representatives, Life-Cycle Managers (LCMs), NAVSEA Technical Warrant Holders, In-Service Engineering Agents (ISEAs), PEOs, TMA/TMI, Industry, and Academia. The project directly supports SECNAV and CNO goals to reduce energy consumption and increase operational capability (i.e., increase time on station). Potential technology target areas will include: Power Generation and Storage systems, Hull Hydrodynamics, Underwater Hull Husbandry, Heating, Ventilation & Air Conditioning (HVAC) Systems, Thermal Management, Main Propulsion Systems, Electrical Systems, Auxiliary Systems, and Energy Monitoring & Assessment. Potential energy saving proposals, Energy Conservation Concepts (ECC), are developed each FY for evaluation by functional category. Based on review of a business case and a technical community review projects are selected for development. Not all proposed ECCs are pursued and changes to planned funding between functional categories or fiscal years can occur based on the technology maturity level, ship schedule changes, or other factors affecting the projected development or testing timeline.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Hull Hydrodynamic Sub Project Articles:	2.270	0.000	0.000	0.000	0.000
Description: (U) Hull Hydrodynamic Sub Project - This project area will accomplish prototype development, modeling, laboratory and Fleet testing of ship modifications to propellers and/or hull appendages to determine overall mission and cost effectiveness of these improvements.	-	-	-	-	-
FY 2018 Plans: N/A					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans: N/A					
Title: Heating , Ventilation and Air Conditioning (HVAC) Sub Project Articles:	0.153	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: (U) HVAC Sub Project - Project funds will be utilized to accomplish prototype development, land and shipboard testing to determine cost effectiveness of improvements aimed at more efficient climate control of shipboard spaces.						
FY 2018 Plans: N/A						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
Title: Propulsion Systems Sub Project	Articles:	0.723	0.000	0.000	0.000	0.000
Description: (U) Propulsion Systems Sub Project - Project funds will be utilized to identify requirements and perform land based and shipboard testing of ship propulsion system improvements on Gas Turbine, Steam, and Diesel Engine systems to reduce overall fuel consumption and lower maintenance costs.		-	-	-	-	-
FY 2018 Plans: N/A						
FY 2019 Base Plans: -						
FY 2019 OCO Plans: N/A						
Title: Thermal Management Sub Project	Articles:	0.320	0.000	0.413	0.000	0.413
Description: (U) Thermal Management Sub Project - Project funds will be utilized to identify and evaluate potential uses for Thermal Management techniques designed to reduce overall shipboard heat generation as well as incorporating waste heat recovery techniques to reduce the shipboard electrical demand on HVAC and other systems.		-	-	-	-	-
FY 2018 Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2019 Base Plans: Continue exploration of waste heat technologies and methods for shipboard application. Provide report of findings with recommendations. Continue to identify additional energy saving/capability improvement technologies in Thermal Management that may be applicable to navy ships. Prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The funding increase supports investigating new waste heat technologies for in-service and future combatants.						
Title: Power Generation and Storage Sub Project Description: Power Generation & Storage System Sub Project - This project area will accomplish prototype development, laboratory and Fleet testing to determine overall effectiveness of technologies focused on improving efficiency of current power generation & storage methodologies.	Articles: - - -	0.200	0.000	0.000	0.000	0.000
FY 2018 Plans: N/A						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
Title: Electrical Systems Sub Project Description: (U) Electrical Systems Sub Project - Project funds will be utilized to identify and perform land based and shipboard testing of ship electrical system improvements to reduce energy.	Articles: - - -	0.412	0.000	0.000	0.000	0.000
FY 2018 Plans: N/A						
FY 2019 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2019 OCO Plans: N/A						
Title: Energy Monitoring & Assessment Description: This project area will focus on methods of capturing and displaying energy related data to shipboard personnel as actionable information for ships force to employ energy conservation measures underway and in port as mission requirements permit.	Articles:	5.519	5.471	5.076	0.000	5.076
FY 2018 Plans: Provide engineering, technical and programmatic support of energy initiatives that put in place shore and shipboard monitoring and assessment tools aimed at optimizing ships' energy profiles and increasing operational capabilities. Continue Global Energy Information System (GENISYS) development efforts, hosting and shipboard evaluation of Fleet Energy Conversation Dashboard (FECD), Vessel Utilization Tool (VFUT), Shipboard energy Assessment System (SEAS), and eLogBooks to support future fleet-wide implementation including integration of enterprise Remote Monitoring (eRM) capabilities to support future fleet-wide implementation. Based on successful evaluation of TRITON prototype installation complete qualification testing of equipment for fleet wide implementation.		-	-	-	-	-
FY 2019 Base Plans: Provide engineering, technical and programmatic support of energy initiatives that put in place shore and shipboard monitoring and assessment tools aimed at optimizing ships' energy profiles and increasing operational capabilities. Continue GENISYS development efforts and shipboard evaluation including integration of GENISYS with enterprise Remote Monitoring (eRM) capabilities to support future fleet-wide implementation. Continue to identify additional energy saving/capability improvement technologies and monitoring methodologies and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.						
Accomplishments/Planned Programs Subtotals		9.597	5.471	5.489	0.000	5.489

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / <i>Navy Energy Program</i>	Project (Number/Name) 0829 / <i>ENERGY CONSERVATION (ADV)</i>
C. Other Program Funding Summary (\$ in Millions)		
N/A		
Remarks		
D. Acquisition Strategy RDT&E Contracts are Competitive Procurements.		
E. Performance Metrics Quarterly Program Reviews		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program					Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	NAVSEA HQ : Washington, DC	0.000	0.000		1.110	Jan 2018	0.000		-		0.000	0.000	1.110	-
Systems Engineering	WR	NSWC DD : Dahlgren, MD	0.000	0.100	Nov 2016	0.000		0.000		-		0.000	0.000	0.100	-
Systems Engineering	WR	NSWC PHila : Philadelphia, PA	0.821	0.834	Nov 2016	0.175	Nov 2017	0.328	Nov 2018	-		0.328	0.000	2.158	-
Primary Hardware Development	WR	NSWC Carderock : Bethesda, MD	8.983	0.000		0.000		0.000		-		0.000	0.000	8.983	-
Systems Engineering	WR	NSWC PHD : Port Hueneme, CA	0.000	0.100	Nov 2016	0.000		0.000		-		0.000	0.000	0.100	-
Systems Engineering	C/CPAF	NSWC Carderock : Bethesda, MD	6.635	0.000		0.000		0.000		-		0.000	0.000	6.635	-
Engineering Development	WR	NSWC Carderock : Bethesda, MD	7.848	0.521	Nov 2016	0.000		0.000		-		0.000	0.000	8.369	-
Demonstration & Evaluation	WR	NSWC Carderock : Bethesda, MD	8.149	0.000		0.000		0.000		-		0.000	0.000	8.149	-
System Development	C/BOA	NAWC-AD : Lakehurst, NJ	0.000	1.300	Jan 2017	1.286	Jan 2018	2.169	Jan 2019	-		2.169	0.000	4.755	-
Primary Hardware Development	C/CPAF	NSWC PHila : Philadelphia, PA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			32.436	2.855		2.571		2.497		-		2.497	0.000	40.359	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NSWC Carderock : Bethesda, MD	2.843	0.000		0.000	Jan 2018	0.344	Nov 2018	-		0.344	Continuing	Continuing	Continuing
Software Support	WR	NSWC Carderock : Bethesda, MD	0.522	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NSWC Carderock : Bethesda, MD	1.200	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program					Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Study Anaylsis	WR	NSWC Carderock : Bethesda, MD	1.174	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Development Support	C/CPAF	NSWC SSES : Philadelphia, PA	0.878	0.000		0.000		0.100	Jan 2019	-		0.100	0.000	0.978	-
Development Support	C/CPFF	NAVSEA HQ : Washington, DC	0.100	0.149	Oct 2017	0.601	Feb 2018	0.479	Jan 2019	-		0.479	0.000	1.329	-
Software Support	C/CPAF	NSWC SSES : Philadelphia, PA	0.281	0.000		0.000		0.000		-		0.000	0.000	0.281	-
Software Support	C/CPAF	NAVSEA HQ : Washington, DC	1.200	0.000		0.000		0.000		-		0.000	0.000	1.200	-
Development Support	WR	NSWC PHila : Philadelphia, PA	0.000	2.146	Nov 2016	0.125	Dec 2017	0.494	Nov 2018	-		0.494	0.000	2.765	-
Development Support	C/CPAF	SUPSHIP : Bath, MA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			8.198	2.295		0.726		1.417		-		1.417	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	9.961	0.000		0.000		0.085	Dec 2018	-		0.085	Continuing	Continuing	Continuing
Operational Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	8.375	2.270	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Live Fire Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	0.382	0.000		0.000		0.000		-		0.000	0.000	0.382	-
Developmental Test & Evaluation	C/CPAF	NSWC Philadelphia : Philadelphia, PA	0.383	0.000		0.000		0.000		-		0.000	0.000	0.383	-
Developmental Test & Evaluation	WR	NSWC SSES : Philadelphia, PA	0.000	0.549	Nov 2016	0.369	Feb 2018	0.000		-		0.000	0.000	0.918	-
Developmental Test & Evaluation	WR	APL : Washington, DC	0.000	0.000		0.000		0.085	Jan 2019	-		0.085	0.000	0.085	-
Subtotal			19.101	2.819		0.369		0.170		-		0.170	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWC Philadelphia : Philadelphia, PA	6.180	0.500	Nov 2016	0.622	Nov 2017	0.000		-		0.000	0.000	7.302	-
Travel	Allot	NAVSEA HQ : Washington, DC	0.176	0.013	Nov 2016	0.013	Dec 2017	0.007	Dec 2018	-		0.007	0.000	0.209	-
Total Assets	WR	NSWC Carderock : Bethesda, MD	0.352	0.000		0.000		0.000		-		0.000	0.000	0.352	-
Program Management Support	C/CPFF	NAVSEA HQ : Washington, DC	0.890	0.790	Jan 2017	0.813	Jan 2018	1.378	Jan 2019	-		1.378	0.000	3.871	-
Program Management Support	WR	NSWC Carderock : Bethesda, MD	0.350	0.325	Nov 2016	0.357	Nov 2017	0.020	Mar 2019	-		0.020	0.000	1.052	-
Subtotal			7.948	1.628		1.805		1.405		-		1.405	0.000	12.786	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			67.683	9.597		5.471		5.489		-		5.489	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

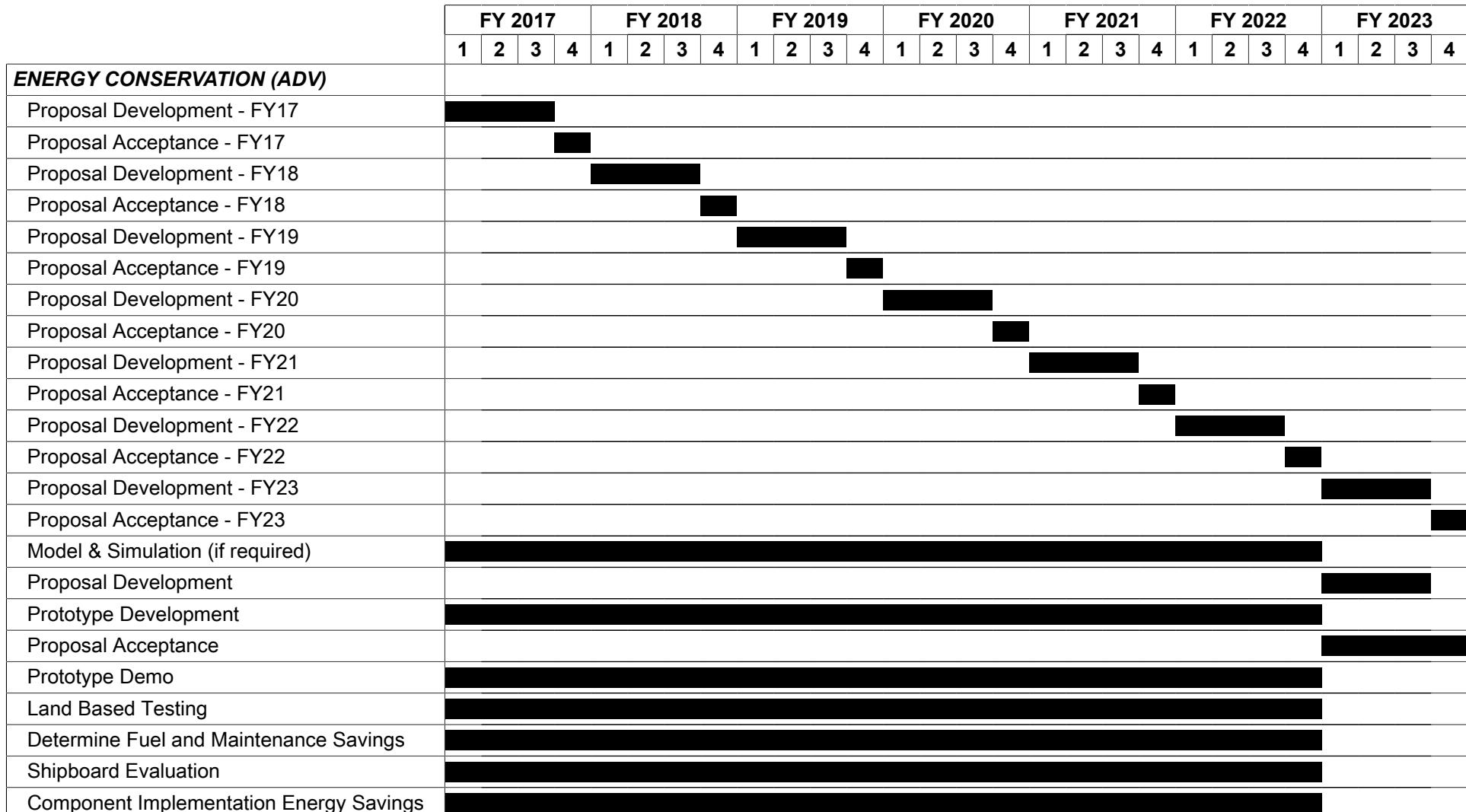
1319 / 4

R-1 Program Element (Number/Name)

PE 0603724N / Navy Energy Program

Project (Number/Name)

0829 | ENERGY CONSERVATION (ADV)



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)		
Schedule Details				
Events by Sub Project		Start	End	
ENERGY CONSERVATION (ADV)				
Proposal Development - FY17		1	2017	3
Proposal Acceptance - FY17		4	2017	4
Proposal Development - FY18		1	2018	3
Proposal Acceptance - FY18		4	2018	4
Proposal Development - FY19		1	2019	3
Proposal Acceptance - FY19		4	2019	4
Proposal Development - FY20		1	2020	3
Proposal Acceptance - FY20		4	2020	4
Proposal Development - FY21		1	2021	3
Proposal Acceptance - FY21		4	2021	4
Proposal Development - FY22		1	2022	3
Proposal Acceptance - FY22		4	2022	4
Proposal Development - FY23		1	2023	3
Proposal Acceptance - FY23		4	2023	4
Model & Simulation (if required)		1	2017	4
Proposal Development		1	2023	3
Prototype Development		1	2017	4
Proposal Acceptance		1	2023	4
Prototype Demo		1	2017	4
Land Based Testing		1	2017	4
Determine Fuel and Maintenance Savings		1	2017	4
Shipboard Evaluation		1	2017	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0829 / ENERGY CONSERVATION (ADV)		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Component Implementation Energy Savings	1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0838 / Mobility Fuels (ADV)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0838: <i>Mobility Fuels (ADV)</i>	79.053	12.774	7.928	7.921	-	7.921	8.194	8.363	8.516	8.707	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides data through laboratory, component, engine, fuel system, and weapon system tests, which relate the effects of changes in the Navy fuel procurement specification properties and chemistries to the performance and reliability of Naval ship, aircraft, and fuel distribution systems. The information is required to: (a) assure interoperability with fuel procured from commercial specifications, (b) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide, (c) provide guidance to fleet operators for the safe use of off-specification fuels or emerging CONOPS requiring the use of non-traditional fuels,(d) technically justify changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in fuel supply, and (e) improve capability to provide fuel quality surveillance in the field and (f) facilitate rapid identification and resolution of field identified fuel deficiencies. Continued volatility and rapid escalation of the cost of fuel have placed additional pressures on Navy budgets responsible for maintaining and sustaining the Navy tactical fleet both now and in the future. These pressures have placed an added emphasis on the potential use of lower cost commercial fuels and/or fuels derived from non-petroleum sources as a potential means of stabilizing the current and anticipated price volatility. Recent problems with petroleum-based fuel quality have demonstrated the adverse effects that fuel-related problems can have on ship and aircraft system performance, reliability, and readiness. The program addresses readiness, additional maintenance costs, and the cost of lost equipment. The potential risk of fuel-related problems over the next decade, given the unknown supply, feedstocks, and the introduction of new theaters of operation, will continue to increase.

This project represents the Navy's only investment designed to maintain its capability to operate as a "smart" customer for fuels that cost over \$4.0 billion per year for procurement, transport, storage, and consumption, and are essential to fleet operations.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Naval Tactical Fuels Articles: Description: Perform development, test and evaluation work on Naval tactical fuels to: a) assure interoperability with commercial fuel specifications, b) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; c) provide guidance to fleet operators for the safe use of off-specification or non-primary fuels , d) validate periodic changes to the Navy tactical fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry and e) improve fleet methods to ensure fuel quality.	12.774	7.928	7.921	0.000	7.921

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0838 / Mobility Fuels (ADV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Conduct testing to assure interoperability with commercial fuel specifications. Conduct research, development, test, and evaluation to mitigate field-identified aviation and ship propulsion fuel deficiencies. Conduct research, development, test, and evaluation to improve/reduce cost of Naval tactical fuel quality surveillance and analysis.						
FY 2019 Base Plans: Conduct rig and component tests to assure interoperability with changing worldwide commercial aviation fuel specifications. Continue development of analytical tools to facilitate rapid mitigation of field-identified aviation and ship propulsion fuel deficiencies. Continue development data analytic techniques to rapidly evaluate fuel chemical composition, performance and field databases. Field trial advance fuel quality surveillance tools .						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.	Accomplishments/Planned Programs Subtotals	12.774	7.928	7.921	0.000	7.921
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
Testing efforts will be competitively contracted, and performed under Cost Plus Fixed Fee and Firm Fixed Price contracts.						
E. Performance Metrics						
Program will assess changes and develop data, test methods and hardware performance analysis for all Naval aircraft and ships. Program will evaluate fuel chemistry and properties and develop technologies to identify and assess impact of differences.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program					Project (Number/Name) 0838 / Mobility Fuels (ADV)					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NRL : Washington, D.C.	4.202	0.850	Nov 2016	1.100	Dec 2017	0.800	Dec 2018	-		0.800	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : Patuxent River, MD	14.418	2.400	Nov 2016	2.297	Dec 2017	2.046	Dec 2018	-		2.046	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Philadelphia, PA	3.508	0.270	Jan 2017	0.150	Jan 2018	0.500	Jan 2019	-		0.500	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Bethesda, MD	0.312	0.000		0.050	Feb 2018	0.100	Mar 2019	-		0.100	Continuing	Continuing	Continuing
Systems Engineering	C/FFP	Various : Various	0.000	0.960	Mar 2017	1.269	Mar 2018	0.652	Apr 2019	-		0.652	0.000	2.881	2.881
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	0.161	0.000		0.000		0.000		-		0.000	0.000	0.161	-
Subtotal			22.601	4.480		4.866		4.098		-		4.098	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Fuel	C/FFP	Various : Various	2.000	0.000		0.000		0.000		-		0.000	0.000	2.000	2.000
Test Fuel	C/FFP	Applied Research Associates : Albuquerque, NM	3.858	0.000		0.000		0.000		-		0.000	0.000	3.858	3.858
Hardware Testing	WR	NAWCAD : Patuxent River, MD	4.349	0.100	Nov 2016	0.200	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
Hardware Testing	C/CPFF	Life Cycle Engineering : Charleston, SC	10.030	2.950	Apr 2017	2.000	Dec 2017	1.943	Apr 2019	-		1.943	0.000	16.923	16.923
Hardware Testing	SS/CPFF	Rolls Royce : Indianapolis, IN	2.912	0.000		0.000		0.000		-		0.000	0.000	2.912	2.912
Hardware Testing	C/CPFF	Univ of Dayton Research Inst : Dayton, OH	0.689	0.200	Apr 2017	0.000		0.400	Feb 2019	-		0.400	0.000	1.289	1.289
Hardware Testing	WR	US Naval Academy : Annapolis, MD	0.098	0.000		0.050	May 2018	0.050	Apr 2019	-		0.050	0.000	0.198	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program					Project (Number/Name) 0838 / Mobility Fuels (ADV)					
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	C/CPFF	General Electric : Lynn, MA	1.237	0.000		0.000		0.000		-		0.000	0.000	1.237	1.237
Hardware Testing	WR	NSWC : Philadelphia, PA	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Hardware Testing	C/FFP	Various : Various	1.509	4.674	Sep 2017	0.500	Jan 2018	0.920	Feb 2019	-		0.920	0.000	7.603	7.603
Hardware Testing	WR	NSWC : Port Hueneme, CA	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
Hardware Testing	C/CPFF	DL Mgmt Services JT Venture : Plainfield, IL	0.004	0.000		0.000		0.000		-		0.000	0.000	0.004	0.004
Fuel Delivery	MIPR	DLA-Energy : Ft. Belvoir, VA	0.497	0.150	Dec 2016	0.000		0.000		-		0.000	0.000	0.647	-
Fuel Blend Testing	WR	Naval Medical Research Unit : Dayton, OH	0.042	0.000		0.000		0.000		-		0.000	0.000	0.042	-
Prior year T & E no longer funded in the FYDP	Various	Various : Various	21.212	0.000		0.000		0.000		-		0.000	0.000	21.212	-
Subtotal			48.717	8.074		2.750		3.513		-		3.513	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Patuxent River, MD	1.088	0.203	May 2017	0.300	Dec 2017	0.300	Dec 2018	-		0.300	Continuing	Continuing	Continuing
Program Management Support	WR	NAVSUP : San Diego, CA	0.022	0.005	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Management Support	C/FFP	Coord Research Council : Alpharetta, GA	0.040	0.010	Dec 2017	0.010	Nov 2017	0.010	Nov 2018	-		0.010	0.000	0.070	0.070
Program Management Support	WR	NAVSEA : Washington, DC	0.002	0.002	Apr 2017	0.002	Nov 2017	0.000		-		0.000	0.000	0.006	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0838 / Mobility Fuels (ADV)							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior year Mgmt Supp no longer funded in the FYDP	Various	Various : Various	6.583	0.000		0.000		0.000		-		0.000	0.000	6.583	-
Subtotal			7.735	0.220		0.312		0.310		-		0.310	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			79.053	12.774		7.928		7.921		-		7.921	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018								
Appropriation/Budget Activity 1319 / 4								R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program								Project (Number/Name) 0838 / Mobility Fuels (ADV)								
Mobility Fuels (ADV)	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Alternative Fuel Evaluation/Certification																								
	Alternative Fuel Evaluation/Certification																							
Advanced BioFuel Testing	Generation 3 Protocol Development																							
	Advanced BioFuel Lab/Rig Testing																							
Field-Identified Fuel Deficiencies	Advanced BioFuel Hardware Testing																							
																	RDTE in Support of Field-Identified Deficiencies							
Fuel Quality Surveillance/Analysis																	RDTE to Develop/Improve Operational & Laboratory Techniques/Technologies							
																	Evaluate and Maintain compatibility with commercial aviation fuel spec							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0838 / Mobility Fuels (ADV)		
Schedule Details				
Events by Sub Project		Start	End	
Mobility Fuels (ADV)				
Alternative Fuel Evaluation/Certification: Alternative Fuel Evaluation/Certification	1	2017	4	2017
Alternative Fuel Evaluation/Certification: Generation 3 Protocol Development	1	2017	2	2017
Advanced BioFuel Testing: Advanced BioFuel Lab/Rig Testing	1	2017	2	2017
Advanced BioFuel Testing: Advanced BioFuel Hardware Testing	1	2017	2	2017
Field-Identified Fuel Deficiencies: RDTE in Support of Field-Identified Fuel Deficiencies	1	2017	4	2023
Fuel Quality Surveillance/Analysis: RDTE to Develop/Improve Operational & Laboratory Techniques/Technologies	1	2018	4	2023
Fuel Quality Surveillance/Analysis: Evaluate and Maintain compatibility with commerical aviation fuel spec	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0928 / Shore Energy Technology			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0928: Shore Energy Technology	50.252	1.957	1.800	1.704	-	1.704	1.859	1.898	1.936	1.976	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Legislation, Executive Orders (EO), and SECNAV Guidance direct DoN to reduce fossil fuel use and increase energy resiliency through efficiency, reliability, and alternative energy sources. This guidance includes the National Defense Authorization Act of 2010, which directs DOD to source 25% of its energy from renewable sources by 2025, EO13514, which directs DOD to reduce greenhouse gas emissions by 2020, and SECNAV energy goals, which direct that 50% of DoN's energy come from alternative sources by 2020. Further, studies by the Defense Science Board and others have stressed the dangerous reliance of DOD on vulnerable grid power and unreliable imported oil.

This Energy RDT&E Project will test, evaluate, and validate components as well as demonstrate cost-effective and technical viability of energy security and efficiency, and technologies. All efforts will be coordinated across DOD and with other agencies as appropriate. Specifically, this project aims to pursue three areas of development, testing and evaluation: (A) Modeling and possible prototype testing of new energy sources for use at Naval installations with potential for widespread applicability to energy security; (B) It will support demonstration and validation of advanced electric grid management systems, known as "Smart Grid" and "Micro Grid" technology, for use at Naval installations to enable improved energy security; (C) Demonstration and Validation of Alternative Energy, Energy Efficiency, and Smart Energy Management Technology: This project will support the testing, demonstration, validation, and application of innovative facility energy efficiency and alternative energy technology.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Shore Energy Technology	1.957	1.800	1.704	0.000	1.704
Articles:	-	-	-	-	-

FY 2018 Plans:

- Continue demonstration, testing, and evaluation of improved and low cost smart and micro grid energy management technologies.
- Complete microgrid test bed. Install microgrid components and control system. Commission system.
- Continue demonstration of energy security cyber secure technologies.
- Test, validate and demonstration wireless lighting control system in closed environment in order to gain certification for widespread implementation.
- Demonstrate energy efficient Containerized Living Units (CLU). Test CLU in operational environment in order to implement energy efficient living quarters for forward environments.
- Complete diesel uninterruptable power supply flywheel study to determine applicability and viability of technology for energy resilient microgrid systems.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0928 / Shore Energy Technology	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>-Installation, demonstration and validating of energy efficient wastewater treatment on mobile and stationary facilities to save energy and water.</p> <p>-Demonstration and validation of cyber security technologies for energy controls systems in a controlled test environment to enable a cybersecure environment.</p>				
FY 2019 Base Plans:				
<ul style="list-style-type: none"> - Continue demonstration, testing, and evaluation of improved and low cost smart and microgrid energy management technologies to enable energy security. - Continue demonstration of cyber secure technologies utilizing cyber testbed. - Test, validate and demonstrate wireless controls. Obtain Risk Management Framework certification, install, and test in operational environment. - Installation and demonstration of energy efficient wastewater treatment of both mobile and stationary facilities to save energy and water. Test systems in operational environment. - Demonstration and validation of cyber security technologies for energy controls systems in an operational environment to enable a cyber secure environment. - Initiate new projects in energy resiliency including cyber security of energy controls systems. 				
FY 2019 OCO Plans:				
N/A				
FY 2018 to FY 2019 Increase/Decrease Statement:				
No significant changes in from FY 2018 to FY 2019.				
Accomplishments/Planned Programs Subtotals		1.957	1.800	1.704
0.000		1.704		
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
Demonstration and validation are conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.				
E. Performance Metrics				
The program will be coordinated across DOD and with other agencies as appropriate.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0928 / Shore Energy Technology							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Renewable Energy	Various	EXWC : Port Hueneme, CA	42.028	0.232	Oct 2016	0.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Energy Efficiency, Security and Systems (Includes cybersecurity)	Various	EXWC : Port Hueneme, CA	4.122	0.505	Oct 2016	1.800	Oct 2017	1.704	Oct 2018	-		1.704	Continuing	Continuing	Continuing
Energy Storage	Various	EXWC : Port Hueneme, CA	4.102	1.220	Oct 2016	0.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			50.252	1.957		1.800		1.704		-		1.704	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			50.252	1.957		1.800		1.704		-		1.704	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018																													
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)																													
1319 / 4								PE 0603724N / Navy Energy Program								0928 / Shore Energy Technology																													
FY 2017 FY 2018 FY 2019 FY 2020 FY 2021 FY 2022 FY 2023																																													
Renewable Energy		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																				
Renewable Energy																																													
Energy Efficiency, Security and Systems (Includes Cybersecurity)																																													
Energy Efficiency, Security and Systems (Includes Cybersecurity)																																													
Energy Storage																																													
Energy Storage																																													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0928 / Shore Energy Technology	
Schedule Details			
Events by Sub Project		Start	
		Quarter	Year
Renewable Energy			
Renewable Energy		1	2017
Energy Efficiency, Security and Systems (Includes Cybersecurity)			
Energy Efficiency, Security and Systems (Includes Cybersecurity)		1	2017
Energy Storage			
Energy Storage		1	2017
		3	2017

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0996 / Aircraft Energy Conservation				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0996: Aircraft Energy Conservation	116.739	25.829	10.424	10.542	-	10.542	10.756	10.969	11.185	11.411	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			
A. Mission Description and Budget Item Justification													
The Aircraft Energy Conservation (AIR-ENCON) program is designed to develop and implement energy and maintenance saving improvements into existing fleet assets. The program identifies, evaluates, and implements energy savings initiatives for potential implementation into Naval aircraft. The objective of the program is to engage technical experts from across Naval aviation, industry, and academia to identify mature potential energy saving opportunities and determine the technical and fiscal viability of implementing them in existing aircraft platforms to enable significant improvement in mission capability.													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
Title: Aircraft Energy Conservation Articles: FY 2018 Plans: Continue identification, validation, and implementation of energy conservation/efficiency concepts. Identify, develop and validate of fleet best practices, metrics and energy dashboards. Continue validation of an advanced algorithm to optimize the trim/reduce the drag of the F-18 during flight. Continue evaluation of engine technology to improve efficiency of the MQ-8C and F-18. FY 2019 Base Plans: Continue identification, validation and implementation of energy conservation/efficiency concepts, best practices and metrics. Field aviation energy fleet dashboard. Initiate fielding of algorithm to optimize trim/reduce drag of F-18 during flight. Continue evaluation of engine technology to improve efficiency of MQ-8C and F-18. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: The \$118K increase will accelerate completion of engine efficiency technology study.													
Accomplishments/Planned Programs Subtotals													
FY 2017 FY 2018 FY 2019 Base FY 2019 OCO FY 2019 Total													
25.829 10.424 10.542 0.000 10.542													
C. Other Program Funding Summary (\$ in Millions)													
N/A													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / <i>Navy Energy Program</i>	Project (Number/Name) 0996 / <i>Aircraft Energy Conservation</i>
C. Other Program Funding Summary (\$ in Millions)		
<u>Remarks</u>		
D. Acquisition Strategy This is a non-acquisition program that develops, evaluates, and validates mature technologies in support of increased missioned capability and fleet fuel maintenance savings.		
E. Performance Metrics Actual performance of energy conservation initiatives are measured against initially projected fuel savings measured in barrels of fuel saved based on aircraft demonstration testing.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program					Project (Number/Name) 0996 / Aircraft Energy Conservation					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Patuxent River, MD	4.690	0.955	Nov 2016	1.724	Nov 2017	1.917	Dec 2018	-		1.917	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	Lockheed Martin : Fort Worth, TX	0.684	0.000		0.000		0.000		-		0.000	0.000	0.684	0.684
Systems Engineering	C/FFP	The Boeing Co. : St. Louis, MO	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	0.400
Systems Engineering	C/CPFF	TBD : TBD	0.064	0.000		0.000		0.000		-		0.000	0.000	0.064	0.064
Systems Engineering	C/CPFF	The Boeing Company : Seattle, WA	0.000	1.150	Jan 2017	0.000		0.600	Jan 2019	-		0.600	0.000	1.750	1.750
Systems Engineering	C/CPFF	Various : Various	0.000	3.669	Jan 2017	7.150	Mar 2018	5.425	Mar 2019	-		5.425	0.000	16.244	16.244
Prior year Sys Eng no longer funded in the FYDP	Various	Various : Various	2.464	0.000		0.000		0.000		-		0.000	0.000	2.464	-
Systems Engineering	C/BA	Deloitte Consulting : Alexandria, VA	0.000	0.700	Jul 2017	0.900	Jan 2018	1.200	Apr 2019	-		1.200	0.000	2.800	2.800
Subtotal			8.302	6.474		9.774		9.142		-		9.142	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	C/CPFF	PWA : Hartford, CT	95.711	4.140	Oct 2016	0.000		0.000		-		0.000	0.000	99.851	99.851
Hardware Testing	WR	NAWCAD : Patuxent River, MD	2.185	2.400	Nov 2016	0.300	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Hardware Testing	C/CPFF	Lockheed : Fort Worth, TX	3.134	12.540	Sep 2017	0.000		0.000		-		0.000	0.000	15.674	15.674
Prior year T&E no longer funded in the FYDP	Various	Various : Various	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
Test and Evaluation	C/CPFF	The Boeing Company : Seattle, WA	1.500	0.000		0.000		0.000		-		0.000	0.000	1.500	1.500
Hadware Testing	C/CPFF	Various : Various	0.000	0.000		0.000		1.000	Mar 2019	-		1.000	0.000	1.000	1.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 0996 / Aircraft Energy Conservation								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
		Subtotal	102.630	19.080		0.300		1.000		-		1.000	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	WR	NAWCAD : Patuxent River, MD	1.295	0.275	Nov 2016	0.350	Nov 2017	0.400	Dec 2018	-		0.400	Continuing	Continuing	Continuing	
Program Management Support	C/FFP	Deloitte Consulting : Alexandria, VA	2.415	0.000		0.000		0.000		-		0.000	0.000	2.415	2.415	
Program Management Support	WR	NAWCWD : China Lake, CA	0.010	0.000		0.000		0.000		-		0.000	0.000	0.010	-	
Prog Mgmt no longer funded in the FYDP	Various	Various : Various	2.087	0.000		0.000		0.000		-		0.000	0.000	2.087	-	
		Subtotal	5.807	0.275		0.350		0.400		-		0.400	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				116.739	25.829		10.424		10.542		-		10.542	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																			Date: February 2018																								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)																											
1319 / 4				PE 0603724N / Navy Energy Program								0996 / Aircraft Energy Conservation																															
Aircraft Energy Conservation				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023															
1Q 2Q 3Q 4Q				1Q 2Q 3Q 4Q				1Q 2Q 3Q 4Q				1Q 2Q 3Q 4Q				1Q 2Q 3Q 4Q				1Q 2Q 3Q 4Q				1Q 2Q 3Q 4Q																			
Aircraft Energy Conservation				Air ENCON Program																																							
				Air Vehicle Energy Efficiency RDT&E																																							
				Engine Efficiency RDT&E																																							
				Mission Planning Upgrades																																							
2019DON - 0603724N - 0996																																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 0996 / Aircraft Energy Conservation		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Aircraft Energy Conservation</i>				
Aircraft Energy Conservation: Air ENCON Program		1	2017	4
Aircraft Energy Conservation: Air Vehicle Energy Efficiency RDT&E		1	2017	4
Aircraft Energy Conservation: Engine Efficiency RDT&E		1	2017	4
Aircraft Energy Conservation: Mission Planning Upgrades		1	2017	2

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 9999 / Congressional Adds				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9999: Congressional Adds	12.069	19.343	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	31.412	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification													
Congressional Add for Hydrokinetic Energy Research													
B. Accomplishments/Planned Programs (\$ in Millions)													
Congressional Add: Installation Energy Efficiency Enhancements										FY 2017	FY 2018		
FY 2017 Accomplishments: This congressional add will focus on areas that will cover power generation, energy storage, cyber security, and energy controls and analytics. Broad Area Announcement will be advertised on FedBizOps. Solicitation anticipated to be done by the end of September with the expectation of an award of funding by January 2018.										4.836	0.000		
FY 2018 Plans: N/A													
Congressional Add: Program Increase: Renewable Energy Development										14.507	0.000		
FY 2017 Accomplishments: This congressional add will fund projects that will test wave energy conversion devices in the Navy's wave energy test site (WETS) in Hawaii. In addition, we will test marine hydrokinetic technologies in the Pacific Northwest and assess feasibility for other locations. Contract award/funds execution anticipated during the first quarter of FY18.													
FY 2018 Plans: N/A													
Congressional Adds Subtotals										19.343	0.000		
C. Other Program Funding Summary (\$ in Millions)													
N/A													
Remarks													
D. Acquisition Strategy													
RDTEN Contracts are Competitive Procurements													
E. Performance Metrics													
Quarterly Program Reviews													

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program				Project (Number/Name) 9999 / Congressional Adds							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hydrokinetic Energy Research & Development	Various	EXWC : Port Hueneme, CA	12.069	0.000		0.000		0.000		-		0.000	0.000	12.069	-
Renewable Energy Development	Various	EXWC : Port Hueneme, CA	0.000	14.507	Jan 2018	0.000		0.000		-		0.000	0.000	14.507	-
Installation Energy Efficiency Enhancements	Various	EXWC : Port Hueneme, CA	0.000	4.836	Jan 2018	0.000		0.000		-		0.000	0.000	4.836	-
Subtotal			12.069	19.343		0.000		0.000		-		0.000	0.000	31.412	N/A
Remarks Congressional Add Funds Received 3rd Quarter of 2017 for Projects C299 and C302.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			12.069	19.343		0.000		0.000		-		0.000	0.000	31.412	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018													
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program								Project (Number/Name) 9999 / Congressional Adds															
Proj 9999	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Hydrokinetic Energy Research & Development: Hydrokinetic Energy Research & Development	[REDACTED]																											
Hydrokinetic Energy Research & Development: Renewable Energy Development: Renewable Energy Development	[REDACTED]																											
Hydrokinetic Energy Research & Development: Installation Energy Efficiency Enhancements: Installation Energy Efficiency Enhancements	[REDACTED]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / Navy Energy Program	Project (Number/Name) 9999 / Congressional Adds		
Schedule Details				
Events by Sub Project		Start	End	
Proj 9999		Quarter	Year	Quarter
Hydrokinetic Energy Research & Development: Hydrokinetic Energy Research & Development		4	2017	4
Hydrokinetic Energy Research & Development: Renewable Energy Development: Renewable Energy Development		4	2017	4
Hydrokinetic Energy Research & Development: Installation Energy Efficiency Enhancements: Installation Energy Efficiency Enhancements		4	2017	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603725N / Facilities Improvement								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	13.196	4.213	2.837	5.301	-	5.301	3.399	3.319	3.339	3.395	Continuing	Continuing	
0995: Naval Facilities System	7.769	2.066	1.786	4.078	-	4.078	2.199	2.164	2.170	2.212	Continuing	Continuing	
3155: Force Protection Ashore	2.944	1.230	1.051	1.223	-	1.223	1.200	1.155	1.169	1.183	Continuing	Continuing	
3347: Navy Expeditionary Energy Development	2.483	0.917	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400	

A. Mission Description and Budget Item Justification

Mission Description and Budget Item Justification:

This program provides for capabilities to: a) overcome performance limitations and reduce the life cycle cost of shore facilities and, b) provide protection against terrorist attacks for shore installations and their operations. The program focuses on technical and operational issues of specific Navy interest, where there are no unbiased test validated Commercial Off the Shelf (COTS) solutions available, and where timely capabilities may not materialize without specific demonstration or validation by the Navy. Additionally, the program completes the development of technologies originating from Navy, DOD and other sources of Science and Technology programs, including the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST) and Department of Energy (DOE). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Facilities, Sustainment Restoration and Modernization (FSRM) program, and Antiterrorism and Force Protection (ATFP) Other Procurement, Navy (OP,N) program.

Project 0995 addresses the following Navy facilities requirements during FY 2014 through FY 2020: Advance Technology for Waterfront Facilities Repair and Enhancements, Facilities Technologies to Reduce the Cost of Facilities Sustainment, Restoration and Modernization for reducing the total ownership cost (TOC) of future and existing Facilities and addressing natural and catastrophic risk of critical Naval Waterfront Facilities.

Force Protection Ashore Project 3155 addresses selective topics in modeling, and material technologies to reduce the vulnerability of installations; and reduce the acquisition and operating costs of protective technologies. The demonstrations and validations provide the independent, technical and operational test data for the development of competitive performance specifications to acquire the required capabilities. The ATFP project is coordinated with other DOD programs.

Project 3347: The Development of advanced Environmental Control Unit (ECU) for expeditionary force camp shelters project is a transition of a DOE FY12-14 funded project and is a continuation in technology development, and was transitioned to NAVFAC starting FY 2015.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	5.458	2.837	4.024	-	4.024
Current President's Budget	4.213	2.837	5.301	-	5.301
Total Adjustments	-1.245	0.000	1.277	-	1.277
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.053	0.000			
• SBIR/STTR Transfer	-0.192	0.000			
• Program Adjustments	0.000	0.000	1.493	-	1.493
• Rate/Misc Adjustments	0.000	0.000	-0.216	-	-0.216
Change Summary Explanation					
Increase from FY18 to FY19 is due to a \$2M increase for Port Damage Repair Joint Capability Technology Demonstration.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement				Project (Number/Name) 0995 / Naval Facilities System			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0995: Naval Facilities System	7.769	2.066	1.786	4.078	-	4.078	2.199	2.164	2.170	2.212	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program provides the Navy with new engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available RDT&E resources on satisfying facility requirements where the Navy is a major stakeholder or where there are no tested validated Commercial Off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy science and technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). This program introduces the idea of resilient facilities and infrastructure thru hardening, rapid assessment, and recovery. Validated technologies are implemented in the Navy's Military Construction (MILCON) and Facilities Sustainment Restoration and Modernization Programs (FSRM). The Duncan Hunter National Defense Authorization Act of 2009 laid down very specific guidelines for the correction of corrosion deficiencies in DoD shore facilities which is estimated to be \$1.9B (DOD Annual Cost of Corrosion for the Department of Defense Facilities and Infrastructure July 2010).

Project 0995 addresses two Navy facilities requirements: 1) waterfront facilities repair, upgrade and service life extension; and, 2) validation testing/performance monitoring of critical facilities (such as dry docks, piers, runways, magazines, etc.), testing and evaluation of the performance of alternative materials, and surfacing concepts, and, methods and corrosion technologies to reduce the cost of Sustainment, Restoration and Modernization (SRM).

Waterfront facilities, repair, upgrade and service life extension:

An urgent requirement exists for early identification of strategies and solution recommendations for seismic risk at Naval Facilities, and especially nuclear capable waterfront facilities. Recent Pacific Rim earthquakes have heightened anxiety levels on perceived huge risks to Navy waterfront facilities in the region. The sub-project will provide analysis and solution recommendations for facilities impacted by seismic risk. Waterfront facilities repair and upgrade: About 75% of the Navy's waterfront facilities are over 45 years old. They were designed for a service life of 25 years which was to satisfy the mission requirements existing at that time. The over aged reinforced concrete requires costly and repetitive repairs. Besides providing more pier side ship maintenance and thus reduce dry dock costs, these piers must be strengthened to support concentrated crane loads up to 140 tons when piers were originally not designed for concentrated loads. Piers were previously designed to service one or possibly two particular ship classes. Berthing flexibility is now limited by mooring and utility arrangements. This sub-project addresses new material design methods, and retrofit methods which extends the service life of existing waterfront facilities by an additional 15 or more years. The project also addresses updating the mission based service, environmental, and protection loading requirements imposed by changes in platforms, operations and threats. Other initiatives include: leveraging Building Information Modeling (BIM) technology to provide for enhanced facilities management processes and waterfront utilities service enhancements using models to achieve flexible berthing arrangements consistent with current and future platform mooring configurations and hotel service requirements including Facilities and Infrastructure Integrated Product Support for Acquisition Category (ACAT) Programs.

Technologies to reduce the cost of Sustainment, Restoration and Modernization (SRM):

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement	Project (Number/Name) 0995 / Naval Facilities System				
Technologies to reduce the cost of SRM issues of high operational significance are addressed on a priority basis. The Navy portion of corrosion deficiencies at DoD shore facilities is estimated to be \$433M (DOD Annual Cost of Corrosion for the Department of Defense Facilities and Infrastructure July 2010). This effort will demonstrate and validate the cost and reliability of advanced corrosion technologies in order to assure their acceptance and implementation in traditionally conservative public works and construction industries. These facility corrosion technologies will accelerate the validation commercialization, and wide-spread implementation required to reduce the cost of correcting, the deficiencies in the Navy SRM backlog. The sub-projects include the continuing effort to validate, test and conduct performance monitoring of enhanced facility designs and coatings for facilities and equipment.							
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							
			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Waterfront facilities, repair, upgrade and service life extension: Articles:			0.807	0.707	2.831	0.000	2.831
FY 2018 Plans: FY18 Plans to include: - Facilities Hardening efforts which currently include the Fixed Facility Protection and High Altitude Electro Magnetic Pulse (HEMP) for Navy Ocean Cable Shore Facilities. Fixed Facility Protection is working to develop and validate facility structure to withstand high energy projectiles. The High Altitude Electro Magnetic Pulse project is working to develop and validate defensive facilities which will protect electronic equipment from being damaged by electromagnetic radiation bursts. Findings will transition into Unified Facilities Criteria (UFC) Project, in accordance with the DoD Instruction 4120.24. - Facilities Recovery efforts which currently include Internal Curing of High Performance Concrete, Durable Concrete Repairs and Ultra High Performance Concrete for Structural Repairs. These projects are working to develop and validate concrete options for rapid repair and additional facilities infrastructure resiliency. Findings will transition into Unified Facilities Criteria (UFC) Project, in accordance with the DoD Instruction 4120.24. - Facilities Rapid Assessment efforts currently include Floating Pier Hydrodynamic Evaluation, Pier Mooring Analysis, and an In-Situ Bollard Testing Device. These projects will develop and validate assessment techniques and build numerical models of structural joints subject to wave and tidal motions such as those found in dry docks, piers and wharves. These Use models will improve joint design through dynamic analysis and model refinement. Findings will transition into Unified Facilities Criteria (UFC) Project, in accordance with DoD Instruction 4120.24.			-	-	-	-	-
FY 2019 Base Plans: - Expansion of Facilities Resiliency (Hardening, Rapid Assessment and Recovery) projects to further demonstrate and validate technologies. - Funding the Asia Pacific Stability Initiative (APSI), which is a one-time funded requirement to complete repair for the Port Damage Repair Joint Capability Technology Demonstration (PDR/JCTD). The primary purpose of the funding will be to execute the final operational utility assessment (OUA) through procurement of equipment, as well as development of an engineering performance specification for transition. The work will be done at							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
1319 / 4	PE 0603725N / Facilities Improvement	0995 / Naval Facilities System			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
both Naval Facilities Engineering and Expeditionary Warfare Center (Port Hueneme, CA) and at the Army Engineering Research and Development Center (Vicksburg, MS).					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: FY19 increase will fund APSI initiative to complete repairs on the PDR/JCTD.					
Title: Sustainment, Restoration & Modernization: Articles:	1.259	1.079	1.247	0.000	1.247
FY 2018 Plans: FY18 Plans to include: -Development, testing and validation will continue with unmanned assessment devices such as the Camera Sled and the Unmanned Aerial Vehicle (UAV) for Facilities Inspection and Design Reconstruction. The Camera Sled has potential safety and cost benefits for inspecting pier pilings that are deeper than 100 feet. The Unmanned Aerial Vehicle for Facilities Inspection also has potential safety benefits by providing imagery of areas that may be deemed dangerous. The unmanned system will provide the necessary data processing, sensors, automatic control and communications in order to initiate autonomous systems to support Facilities Inspection Programs to include Airfield Pavements, Petroleum Oil Lubricant (POL) Facilities, Tall Towers, Roofing, etc. The autonomous nature of this technology will significantly increase inspection and design efficiency via faster execution and lower labor costs. Augmented Reality (AR) systems are being tested and evaluated for design and assessment uses. -Expand analysis of Additive Manufacturing (AM) capabilities to include a Knowledge Database (KD) for facilities and infrastructure. The expansion will include both new and existing assets: Investigate existing and projected applications of Additive Manufacturing Knowledge Database (AMKD) to facilities and infrastructure. Define requirements for AMKD technology applications. Procure and evaluate Additive Manufacturing technology against requirements in developmental and operational tests. Findings will transition into unified facilities criteria.	-	-	-	-	
FY 2019 Base Plans: FY19 Plans to include: - Develop, test and validate new concepts new concepts and technologies in the areas of corrosion. This includes the continued demonstration of cost (Return on Investment / ROI) and reliability of advanced corrosion technologies to assure their acceptance and implementation by conservative Public Works and construction industries. Identify technologies and products for accelerated implementation to reduce costs and reduce					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement	Project (Number/Name) 0995 / Naval Facilities System				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
deficiencies in the Navy SRM backlog. Findings will transition into Unified Facilities Criteria (UFC) Project, in accordance with DoD Instruction 4120.24.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY18 to FY19.						
Accomplishments/Planned Programs Subtotals		2.066	1.786	4.078	0.000	4.078
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
The Projects identified in this budget have been carefully selected to respond to both the facilities support for new Acquisition Category Programs, to address TOC considerations of an evolving and aging infrastructure, and to facilitate rational risk based decisions and solutions to protect and decrease risk levels for Department of the Navy-critical infrastructure and facilities. Each project has been assessed to ensure that it is addressing legitimate risks and requirements of the shore establishment. The results of these projects will be the development of design and construction criteria and or components that directly impact the shore facilities.						
E. Performance Metrics						
Quarterly Program Reviews are conducted with the major performers to include funds status discussion, schedule review, assessment of plan to actual to meet benchmarks at midyear and end-of-year for PY1 and CY, and review of accomplishments and issues to date.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement				Project (Number/Name) 0995 / Naval Facilities System							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Waterfront Facilities, Repair, Upgrade and Services Life Extension	Various	NAVFAC EXWC : Pt Hueneme, CA	2.782	0.807	Oct 2016	0.707	Dec 2017	2.831	Oct 2018	-		2.831	Continuing	Continuing	Continuing
Sustainment, Restoration and Modernization	Various	NAVFAC EXWC : Pt Hueneme, CA	4.987	1.259	Oct 2016	1.079	Oct 2017	1.247	Oct 2018	-		1.247	Continuing	Continuing	Continuing
Subtotal		7.769	2.066			1.786		4.078				4.078	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			7.769	2.066		1.786		4.078				4.078	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018											
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4				PE 0603725N / Facilities Improvement								0995 / Naval Facilities System															
				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Waterfront Facilities, Repair, Upgrade and Service Life Extension																											
Continue Waterfront Facilities, Repair, Upgrade and Service Life Extension																											
Engineering Coatings for Fasteners																											
Carbon Fiber Reinforced Polymer Rebar for Concrete Waterfront Facilities																											
Seismic Risk Assessment of Dry Docks																											
Floating Pier Evaluation Hydrodynamics																											
Tsunami Loads and Effects on Waterfront Structures																											
Autonomous Inspection Technology and Systems for Waterfront Facilities																											
Analysis of CVN Drydock																											
ID Issues for New Class SSNs																											
Sea Level Rise Effects																											
High-Altitude Electromagnetic Pulse Hardening (HEMP)																											
Fluid Induced Vibrational (FIV) Degradation and Augmented Reality (AR)																											
Sustainment, Restoration & Modernization																											
Continue Sustainment, Restoration & Modernization																											
Corrosion Prevention and Control																											
Level Spot Treatment Protocol and Maintenance Index for Life Extension of POL Infrastructures																											

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603725N / Facilities Improvement

Project (Number/Name)

0995 / Naval Facilities System

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Seismic Analysis of Earth-Covered Magazines																												
High Temperature Pavement Design Mix Optimization																												
Modular Storage Magazine Multi-Point Locking Device System																												
Evaluate Solutions to Develop Design and Construction Criteria																												
Retrofitting Existing Facilities to Conform to High Performance Building Standards																												
Develop Design Criteria for Closed Piers and Wharves																												
Effectiveness of Vapor Phase Corrosion Inhibitors in Protection of Aboveground Storage Tanks																												
Unmanned Systems for Facilities Inspection and Design Reconstruction																												
Additive Manufacturing (AM)																												
SPIDERS 3D Asset Component Data																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement		Project (Number/Name) 0995 / Naval Facilities System	
Schedule Details				
Events by Sub Project	Start	End	Quarter	Year
Quarter	Year	Quarter	Year	
Waterfront Facilities, Repair, Upgrade and Service Life Extension				
Continue Waterfront Facilities, Repair, Upgrade and Service Life Extension	1	2017	4	2023
Engineering Coatings for Fasteners	1	2017	4	2022
Carbon Fiber Reinforced Polymer Rebar for Concrete Waterfront Facilities	1	2017	4	2022
Seismic Risk Assessment of Dry Docks	1	2017	4	2022
Floating Pier Evaluation Hydrodynamics	1	2017	4	2022
Tsunami Loads and Effects on Waterfront Structures	1	2017	4	2022
Autonomous Inspection Technology and Systems for Waterfront Facilities	1	2017	4	2023
Analysis of CVN Drydock	1	2017	4	2019
ID Issues for New Class SSNs	1	2017	4	2020
Sea Level Rise Effects	1	2017	4	2020
High-Altitude Electromagnetic Pulse Hardening (HEMP)	1	2018	4	2023
Fluid Induced Vibrational (FIV) Degradation and Augmented Reality (AR)	1	2017	1	2023
Sustainment, Restoration & Modernization				
Continue Sustainment, Restoration & Modernization	1	2017	4	2023
Corrosion Prevention and Control	1	2017	4	2023
Level Spot Treatment Protocol and Maintenance Index for Life Extension of POL Infrastructures	1	2017	4	2017
Seismic Analysis of Earth-Covered Magazines	1	2017	4	2022
High Temperature Pavement Design Mix Optimization	1	2017	4	2022
Modular Storage Magazine Multi-Point Locking Device System	1	2017	4	2017
Evaluate Solutions to Develop Design and Construction Criteria	1	2017	1	2019
Retrofitting Existing Facilities to Conform to High Performance Building Standards	1	2017	1	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement	Project (Number/Name) 0995 / Naval Facilities System		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	1	2017	1	2019
	1	2017	1	2022
	1	2018	1	2023
	1	2017	1	2020
SPIDERS 3D Asset Component Data	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement				Project (Number/Name) 3155 / Force Protection Ashore			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3155: Force Protection Ashore	2.944	1.230	1.051	1.223	-	1.223	1.200	1.155	1.169	1.183	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Protection of Navy installations against terrorist activities requires deployment of advanced technology for force protection capabilities. This antiterrorism and force protection (AT/FP) ashore project will develop, demonstrate and validate technologies for the following: access control and integrated perimeter security surveillance sensors and intelligent electronic security systems for automated intruder detection (Installation Protection); perimeter security; waterside protection against craft and swimmer intrusion; secure and efficient operations centers and emergency management centers including human and information support systems (Command and Control). Programs currently being evaluated are, standard-based enterprise physical security system integration and automation; Command, Control, and Communications (C3) capabilities for emergency operations; integrated and networked mass notification systems (MNS); Waterside intelligent video security systems; integrated over-the-water sensors and analytics for automated course of action planning; identifying and interdicting malevolent threats - watercraft, swimmers, divers, and unmanned underwater vessels (UUVs) to reduce injury and death to the warfighter and damage to high value units (HVUs)(Waterside Protection). Through demonstration and validation of risk modeling and simulation models, the potential of emerging technologies will be evaluated and installation security strategies that reduce manpower and other costs will be formulated. Multiple systems with sensors and cameras are being deployed on Navy installations to be used for threat assessment. These systems are not integrated and there is not a centralized location or system that all the data can be analyzed. The Sensor Assessment Cell (SAC) brings all these sensor feeds into one location and the Physical Security Information Management (PSIM) software provides an integrated picture so that an intelligent assessment can be made. Current AT/FP systems to be integrated include Automated Vehicle Gates (AVG), Regional Alarms/Local Alarms (AMAS), Navy Munition Command enclave (NMC), and Electronic Harbor Security System. These demonstrations and validations derive advanced technology from science and technology programs of government academia and industry. The technology evaluation and validation produces data for performance specifications used for competitive procurement. All work will be coordinated with other programs and through industry forums as appropriate.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Force Protection Ashore	1.230	1.051	1.223	0.000	1.223
Articles:	-	-	-	-	-

FY 2018 Plans:
FY 2018 Base Plans:
Funds will support continued and initiated projects from FY16 and FY17 as follow:
- Continue Installation Protection Capability Development - Airborne Threat project to detect, assess and classify for the defense against full-scale and man-deployable airborne threats (e.g., UAV, drones, remote-control [R/C] platforms.-Testing of three Counter UAS systems at NAWC China Lake. Test plan and test report deliverables-[\$379K] - Developmental Test & Evaluation (DT); NAWCAD/ONR.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement	Project (Number/Name) 3155 / Force Protection Ashore				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue Command and Control Capability Development Virtual Field Support project to improve efficiency, effectiveness and reliability of the recovery of operational availability during critical system failures (corrective maintenance) and specialized routine maintenance (preventative maintenance). Developers to integrate alarm aggregator into virtual host and interface with Computer Aided Dispatch CAD system and Physical Information Security Manager PSIM. Deliverables include software source code, binaries, and software manuals. - [\$262K] - Developmental Test & Evaluation (DT); SSC PAC: San Diego, CA. - Continue Waterside Protection - Boat Barriers project to access performance, environmental, and operational impact and added benefits of next generation boat barriers using bidirectional technology. - Pilot to deploy Next Gen Water Barrier at Norfolk Naval Station between pier 10 and 10a. NSWC Panama City. Deliverables include deployment of barrier, test plan and test reports.[\$410K] - Developmental Test & Evaluation (OT); CTTSO.						

FY 2019 Base Plans:

FY 2019 Base Plans:

- Continue Installation Protection Capability Development - Airborne Threat project to detect, assess and classify for the defense against full-scale and man-deployable airborne threats (e.g., UAV, drones, remote-control [R/C] platforms). Emphasis on mobile Counter UAS systems and direct control of UAS system. Testing at NAWC China Lake. Test plan and test report deliverables-[\$330K] - Developmental Test & Evaluation (DT); NAWCAD/ONR.
- Continue Command and Control Capability Development Virtual Field Support project to improve efficiency, effectiveness and reliability of the recovery of operational availability during critical system failures (corrective maintenance) and specialized routine maintenance (preventative maintenance). Integrate system interfaces in a virtual environment to include CUAS and EHSS. Deliverables include software source code, binaries, and software manuals - [\$220K] - Developmental Test & Evaluation (DT); SSC Atlantic.
- Continue Waterside Protection - Boat Barriers project to access performance, environmental, and operational impact and added benefits of next generation boat barriers using bidirectional technology. Independent Testing of boat barriers by John Hopkins APL. Deliverables include testing of boat barrier, test plan and test reports [\$369K] - Developmental Test & Evaluation (OT).
- Sensor Assessment Cell (SAC) Project to develop, test and integrate a system of AT/FP sensors/camera's and provide an integrated picture to trained operators, who will assess information provided to them via a Physical Security Information System(PSIM) and determine if the event captured should trigger a dispatch of first responders. Test and develop CONOPS for regionally monitoring all alarms and sensors at a central location

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement	Project (Number/Name) 3155 / Force Protection Ashore				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
and interfacing with ENERMS directly. Deliverables include SAC testing at the SW region RDC, test plan and test report. [\$304K].						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY18 to FY19.						
Accomplishments/Planned Programs Subtotals		1.230	1.051	1.223	0.000	1.223
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
Demonstration and validation is conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.						
E. Performance Metrics						
Quarterly program reviews to include funds status, schedule review and assessment of plan to actual.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement					Project (Number/Name) 3155 / Force Protection Ashore					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Command and Control Capability Development: Government Engineering Support	Various	SPAWAR : San Diego, CA	0.499	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Installation Protection: Airborne Threat	WR	NAWCAD/ONR : Pax River, MD	0.000	0.538	Feb 2017	0.379	Feb 2018	0.330	Nov 2018	-		0.330	0.000	1.247	-
Command and Control Capability Development: Virtual Field Support	WR	SPAWAR : San Diego, CA	0.000	0.425	Feb 2017	0.262	Feb 2018	0.220	Nov 2018	-		0.220	0.000	0.907	-
Waterside Protection: Boat Barriers	C/CPFF	CTTSO : CTTSO	0.000	0.267	Feb 2017	0.410	Feb 2018	0.369	Nov 2018	-		0.369	0.000	1.046	-
Sensor Assessment Cell (SAC) Capability Development	Various	SPAWAR : San Diego, CA	0.000	0.000		0.000		0.304	Nov 2018	-		0.304	0.000	0.304	-
Installation Protection Capability Development - Integrated Physical Security and Access Control Automation: Spiral Development	Various	NSWC : Dahlgren, VA	0.597	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Installation Protection Capability Development -Integrated Physical Security and Access Control Automation:Test & Evaluation (DT)	Various	NSWC : Dahlgren, VA	0.449	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Installation Protection Capability Development - Integrated Physical Security and Access Control Automation:Test & Evaluation (OT)	Various	SPAWAR : San Diego, CA	0.332	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Water Protection - Common Information Exchange Spiral Development	WR	SSC-PAC : SSC-PAC	0.244	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement				Project (Number/Name) 3155 / Force Protection Ashore						
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Installation Protection - Versatile Access Control Spiral Development	WR	NSWC : Dahlgren, VA	0.339	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Waterside Protection - Boat Barrier Electronic Infrastructure - Spiral Development	WR	SSC-PAC : SSC-PAC	0.484	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			2.944	1.230		1.051		1.223		-		1.223	Continuing	Continuing	N/A
Remarks				As a result of FY16 decrease in funding levels the Installation Protection Capability Development - Incident Management System (IMS) - Spiral Development project is now rescheduled for FY17 and FY18 restoral funds. Installation Protection: Access Control Automation											
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			2.944	1.230		1.051		1.223		-		1.223	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement					Project (Number/Name) 3155 / Force Protection Ashore						
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Installation Protection Capability Development																
Installation Protection Capability Development																
Subproj: Integrated Physical Security and Access Control Automation: Spiral Development																
Subproj: Installation Protection - Airborne Threat: Test & Evaluation (DT)																
Installation Protection - Access Control: Test & Evaluation (DT)																
Command and Control Capability Development																
Command and Control Capability Development																
Subproj: Command and Control Capability Development - Virtual Field Support: Test & Evaluation (DT)																
Waterside Protection Capability Development																
Waterside Protection Capability Development																
Subproj: Automated Sensor Assessment and Course of Action Planning: Spiral Development																
Subproj: Waterside Protection: Common Information Exchange - Spiral Development																
Waterside Protection Boat Barriers - Test and Evaluation (OT)																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018							
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement								Project (Number/Name) 3155 / Force Protection Ashore											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Sensor Assessment Cell (SAC) Capability Development: Subproj: Physical Security Information Manager (PSIM)																								
Sensor Assessment Cell (SAC) Capability Development: Subproj: PSIM Sensor Integration																								
Sensor Assessment Cell (SAC) Capability Development: Subproj: Regional Dispatch/ SAC systems Integration																								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement		Project (Number/Name) 3155 / Force Protection Ashore					
Schedule Details								
Events by Sub Project								
	Start	End						
	Quarter	Year	Quarter	Year				
Installation Protection Capability Development								
Installation Protection Capability Development	1	2017	4	2022				
Subproj: Integrated Physical Security and Access Control Automation: Spiral Development	2	2017	4	2022				
Subproj: Installation Protection - Airborne Threat: Test & Evaluation (DT)	2	2017	4	2020				
Installation Protection - Access Control: Test & Evaluation (DT)	2	2017	4	2020				
Command and Control Capability Development								
Command and Control Capability Development	1	2017	4	2022				
Subproj: Command and Control Capability Development - Virtual Field Support: Test & Evaluation (DT)	2	2017	4	2020				
Waterside Protection Capability Development								
Waterside Protection Capability Development	1	2017	4	2022				
Subproj: Automated Sensor Assessment and Course of Action Planning: Spiral Development	1	2017	4	2022				
Subproj: Waterside Protection: Common Information Exchange - Sprial Development	1	2017	2	2022				
Waterside Protection Boat Barriers - Test and Evaluation (OT)	2	2017	4	2020				
Sensor Assessment Cell (SAC) Capability Development: Subproj: Physical Security Information Manager (PSIM)	1	2017	4	2022				
Sensor Assessment Cell (SAC) Capability Development: Subproj: PSIM Sensor Integration	1	2019	4	2022				
Sensor Assessment Cell (SAC) Capability Development: Subproj: Regional Dispatch/ SAC systems Integration	1	2019	4	2022				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement					Project (Number/Name) 3347 / Navy Expeditionary Energy Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3347: Navy Expeditionary Energy Development	2.483	0.917	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification Development of advanced Environmental Control Unit (ECU) for expeditionary force camp shelters will reduce the heating and air-conditioning (HVAC) fuel consumption by 50% and also will reduce fuel transport convoys, and attendant manpower casualties and handling labor.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
<i>Title:</i> Expeditionary Environmental Control Unit (EECU) <i>FY 2018 Plans:</i> N/A <i>FY 2019 Base Plans:</i> N/A <i>FY 2019 OCO Plans:</i> N/A						Articles:	0.917	0.000	0.000	0.000	0.000	
							-	-	-	-	-	
						Accomplishments/Planned Programs Subtotals	0.917	0.000	0.000	0.000	0.000	
C. Other Program Funding Summary (\$ in Millions) N/A Remarks												
D. Acquisition Strategy Development of this technology will continue in partnership with the Advanced Research Projects Agency-Energy (ARPA-E). The Navy is positioned to transition the technology into a procurement program once technologies are operationally test and accepted. Additionally, the Navy is pursuing methods to transition the program to the DoD Program Manager for Mobile Electric Power so that all of DoD can benefit from this latest generation, energy saving technology.												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / <i>Facilities Improvement</i>	Project (Number/Name) 3347 / <i>Navy Expeditionary Energy Development</i>
E. Performance Metrics Quarterly Program Reviews will be conducted with the major performer to include cost, schedule, and performance risks for milestone achievement associated with the full scale prototypes		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement					Project (Number/Name) 3347 / Navy Expeditionary Energy Development						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Expeditionary Environmental Control Unit (EECU)	Various	EXWC : Port Hueneme, CA	2.483	0.917	Jan 2017	0.000		0.000		-		0.000	0.000	3.400	Continuing
Subtotal			2.483	0.917		0.000		0.000		-		0.000	0.000	3.400	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			2.483	0.917		0.000		0.000		-		0.000	0.000	3.400	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)							
1319 / 4					PE 0603725N / Facilities Improvement					3347 / Navy Expeditionary Energy Development							
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3347																	
Expeditionary Environmental Control Unit (ECU)		[Redacted]															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603725N / Facilities Improvement	Project (Number/Name) 3347 / Navy Expeditionary Energy Development		
Schedule Details				
Events by Sub Project		Start		End
<i>Proj 3347</i>		Quarter	Year	Quarter
Expeditionary Environmental Control Unit (ECU)		1	2017	1
				2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603734N / (U)CHALK CORAL								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	225.665	245.143	267.985	-	267.985	229.547	320.097	325.442	463.457	Continuing	Continuing	
1804: Chalk Coral	0.000	225.665	245.143	267.985	-	267.985	229.547	320.097	325.442	463.457	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				245.860	245.143	290.722	-	-	290.722				
Current President's Budget				225.665	245.143	267.985	-	-	267.985				
Total Adjustments				-20.195	0.000	-22.737	-	-	-22.737				
• Congressional General Reductions				-	-	-	-	-	-				
• Congressional Directed Reductions				-	-	-	-	-	-				
• Congressional Rescissions				-	-	-	-	-	-				
• Congressional Adds				-	-	-	-	-	-				
• Congressional Directed Transfers				-	-	-	-	-	-				
• Reprogrammings				1.550	0.000	-	-	-	-				
• SBIR/STTR Transfer				-6.619	0.000	-	-	-	-				
• Program Adjustments				0.000	0.000	-27.704	-	-	-				
• Rate/Misc Adjustments				-0.001	0.000	4.967	-	-	-				
• Congressional General Reductions				-0.125	-	-	-	-	-				
• Congressional General Reductions Adjustments				-	-	-	-	-	-				
• Congressional Directed Reductions				-15.000	-	-	-	-	-				
• Congressional Directed Reductions Adjustments				-	-	-	-	-	-				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603739N / Navy Logistic Productivity										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	45.634	2.973	2.995	4.059	-	4.059	4.018	3.957	4.040	4.125	Continuing	Continuing			
2955: JEDMICS	43.454	2.109	2.391	2.913	-	2.913	2.925	2.980	3.043	3.107	Continuing	Continuing			
3223: Logistics R&D	2.180	0.864	0.604	1.146	-	1.146	1.093	0.977	0.997	1.018	Continuing	Continuing			
A. Mission Description and Budget Item Justification															
Includes development and evaluation of incentive systems for improving the productivity of civilian and military personnel. Identifies barriers to increased productivity and evaluates the effect of removing them. Develops techniques for easing the introduction of new technology to the work place. Identifies and evaluates methods for improving the quality of work-life.															
Excludes civilian and military manpower and their related costs and military construction costs which are included in appropriate Management and Support elements in this program.															
JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.															
B. Program Change Summary (\$ in Millions)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total								
Previous President's Budget			3.089	2.995	3.357							3.357			
Current President's Budget			2.973	2.995	4.059							4.059			
Total Adjustments			-0.116	0.000	0.702							0.702			
• Congressional General Reductions			-	-											
• Congressional Directed Reductions			-	-											
• Congressional Rescissions			-	-											
• Congressional Adds			-	-											
• Congressional Directed Transfers			-	-											
• Reprogrammings			-	-											
• SBIR/STTR Transfer			-0.116	0.000											
• Program Adjustments			0.000	0.000	0.770							0.770			
• Rate/Misc Adjustments			0.000	0.000	-0.068							-0.068			
Change Summary Explanation															
The FY 2018 request was reduced by -\$0.351 million to account for the availability of prior year execution balances.															
Technical: Not applicable.															

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603739N / <i>Navy Logistic Productivity</i>
Schedule: Not applicable.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity				Project (Number/Name) 2955 / JEDMICS				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2955: JEDMICS	43.454	2.109	2.391	2.913	-	2.913	2.925	2.980	3.043	3.107	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

In FY85 Congress directed the Services and Defense Logistics Agency to permanently capture, manage and control engineering data in digital format so it would be available to support competitive spares re-procurement. The Joint Engineering Data Management Information & Control System (JEDMICS) program manages and controls 100,000,000 engineering images and has 13,000 authorized users responsible for over 77,000 user sessions per month. Over 1.2 million digital images are retrieved each month. New data and new users are added each month as DoD re-engineers its business processes to take advantage of digital data that is managed and controlled for corporate reuse. The JEDMICS system is deployed at 5 interoperable sites that service user locations worldwide. Data stored in JEDMICS is used for Logistics Support, Spares re-procurement, Weapons Systems procurement, Engineering, Maintenance, Distribution, Manufacturing, Air National Guard and Deployed Engineering Technical Services organizations. JEDMICS facilitates work process re-design since it brings the electronic drawings to the desktop, shop floor or flight line in real time eliminating walk, wait and slack time to retrieve drawings. Additionally, Administrative Lead Time, Repair Turn Around Time, Engineering Change Proposal processing time, demilitarization time, and all cycle times dependent on engineering data have decreased with the real time availability of digital engineering data. JEDMICS also facilitates Electronic Commerce since it produces digital technical data packages that can be forwarded along with an electronic order. Funds are for Commercial Off The Shelf (COTS) test, evaluation and integration. JEDMICS development efforts are required to integrate and test COTS upgrades.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: JEDMICS Development Articles:	2.059	2.339	2.861	0.000	2.861
Description: Conduct development efforts associated with JEDMICS software releases. Conduct COTS requirements definition, evaluation, integration and testing of annual baseline releases. Conduct technology insertion of the JEDMICS system that is required to protect the \$21B digital data asset managed in JEDMICS. These annual releases are necessary to incorporate changes that are essential to keeping the system running within the Navy's Enterprise. They include Service mandated Information Technology changes, storage capability increases for emerging engineering data formats, changes to accommodate commercial hardware and software end-of-life product obsolescence, and defenses for newly recognized Information Assurance vulnerabilities affecting the systems various software applications.	-	-	-	-	-

FY 2018 Plans:

Develop and integrate JEDMICS Software Release 3.0.19.

FY 2019 Base Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 2955 / JEDMICS				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Develop and integrate JEDMICS Software Release 3.0.20.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The funding increase from FY 2018 to FY 2019 supports development efforts associated with JEDMICS software releases.						
Title: JEDMICS Test	Articles:	0.026	0.026	0.026	0.000	0.026
Description: Conduct test and readiness reviews and functional performance tests on JEDMICS system.		-	-	-	-	-
FY 2018 Plans: Complete DT of JEDMICS Software Release 3.0.18. Initiate DT of JEDMICS Software Release 3.0.19.						
FY 2019 Base Plans: Complete DT of JEDMICS Software Release 3.0.19. Initiate DT of JEDMICS Software Release 3.0.20.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no change from FY 2018 to FY 2019.						
Title: JEDMICS Evaluation & Review	Articles:	0.024	0.026	0.026	0.000	0.026
Description: Conduct technical evaluations and configuration control reviews of JEDMICS system.		-	-	-	-	-
FY 2018 Plans: Conduct technical evaluations and reviews for JEDMICS Software Release 3.0.20.						
FY 2019 Base Plans: Conduct technical evaluations and reviews for JEDMICS Software Release 3.0.21.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603739N / <i>Navy Logistic Productivity</i>		Project (Number/Name) 2955 / <i>JEDMICS</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
There is no change from FY 2018 to FY 2019.		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Accomplishments/Planned Programs Subtotals					FY 2019 Total
					2.913
					0.000
					2.913
C. Other Program Funding Summary (\$ in Millions)					
N/A					
Remarks					
D. Acquisition Strategy					
Execution of sole-source negotiated requirements type contract for engineering, design, development and test efforts. Performance-based reviews conducted quarterly by the Project Management Office.					
E. Performance Metrics					
1. Complete testing, integration, & upgrade of three major embedded Commercial Off-the-Shelf products. 2. Test & integrate system Information Assurance Vulnerability Management software patch upgrades four times. 3. Complete development, testing, & integration of a minimum twenty corrected high-priority software problem reports.					

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity					Project (Number/Name) 2955 / JEDMICS					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	C/IDIQ	Smartronix Inc. : Hollywood, MD	1.344	0.145	Oct 2016	0.157	Oct 2017	0.160	Oct 2018	-		0.160	Continuing	Continuing	Continuing
Software Development	Various	Northrop Grumman Information : McLean, VA	37.696	1.914	Nov 2016	2.182	Nov 2017	2.701	Nov 2018	-		2.701	Continuing	Continuing	Continuing
Prior Year Support no Longer Funded in Budget Year or Out years	Various	Various : Various	0.216	0.000		0.000		0.000		-		0.000	0.000	0.216	-
Subtotal		39.256	2.059		2.339		2.861		-			2.861	Continuing	Continuing	N/A
Remarks															
Remarks: Funds are for development efforts associated with Commercial Off The Shelf (COTS) obsolescence on the fully deployed COTS Intensive Joint Engineering Data Management Infomation & Control System. Funds are for COTS evalution, integration, and test and evaluation. The common baseline will be maintained and obsolete COTS software and hardware will be replaced. Baseline releases will protect joint interoperability, upgrade operating systems for security patches and supportable versions, support integration to replace obsolete COTS, and upgrade the Oracle database to supportable versions.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	MIPR	WR-ALC/TILAB : Robins AFB, GA	2.546	0.026	Oct 2016	0.026	Oct 2017	0.026	Oct 2018	-		0.026	Continuing	Continuing	Continuing
Subtotal		2.546	0.026		0.026		0.026		-			0.026	Continuing	Continuing	N/A
Remarks															
Supports testing and evaluation of baseline releases in a user environment.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	Naval Air Warfare Center : NAS Patuxent River, MD	0.292	0.013	Oct 2016	0.015	Oct 2017	0.015	Oct 2018	-		0.015	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity				Project (Number/Name) 2955 / JEDMICS						
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Various	Various : Various	0.277	0.011	Jul 2017	0.011	Jul 2018	0.011	Jul 2019	-		0.011	Continuing	Continuing	Continuing
Prior Year Mgmt no Longer Funded in Budget Year or Out years	Various	Various : Various	1.083	0.000		0.000		0.000		-		0.000	0.000	1.083	-
Subtotal		1.652	0.024			0.026		0.026		-		0.026	Continuing	Continuing	N/A
Remarks Supports program compliance reviews and program related travel by government employees.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			43.454	2.109		2.391		2.913		-		2.913	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603739N / Navy Logistic Productivity

Project (Number/Name)

2955 / JEDMICS

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

JEDMICSAquisition Milestones: IOC: IOC Release
3.0.17Aquisition Milestones: IOC: IOC Release
3.0.18Aquisition Milestones: IOC: IOC Release
3.0.19Aquisition Milestones: IOC: IOC Release
3.0.20Aquisition Milestones: IOC: IOC Release
3.0.21Aquisition Milestones: IOC: IOC Release
3.0.22Aquisition Milestones: IOC: IOC Release
3.0.23Aquisition Milestones: Requirements: Service
IPT/ECPs: Service IPT/ECPs Release 3.0.19Aquisition Milestones: Requirements: Service
IPT/ECPs: Service IPT/ECPs Release 3.0.20Aquisition Milestones: Requirements: Service
IPT/ECPs: Service IPT/ECPs Release 3.0.21Aquisition Milestones: Requirements: Service
IPT/ECPs: Service IPT/ECPs Release 3.0.22Aquisition Milestones: Requirements: Service
IPT/ECPs: Service IPT/ECPs Release 3.0.23Aquisition Milestones: Requirements: Service
IPT/ECPs: Service IPT/ECPs Release 3.0.24

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603739N / Navy Logistic Productivity

Project (Number/Name)

2955 / JEDMICS

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.25																														
Aquisition Milestones: Contract Award: 2017 Contract Award																														
Aquisition Milestones: Contract Award: 2018 Contract Award																														
Aquisition Milestones: Contract Award: 2019 Contract Award																														
Aquisition Milestones: Contract Award: 2020 Contract Award																														
Aquisition Milestones: Contract Award: 2021 Contract Award																														
Aquisition Milestones: Contract Award: 2022 Contract Award																														
Aquisition Milestones: Contract Award: 2023 Contract Award																														
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.18																														
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.19																														
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.20																														
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.21																														

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity								Project (Number/Name) 2955 / JEDMICS									
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.22																					
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.23																					
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.24																					
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.18	■																				
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.19	■																				
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.20	■																				
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.21	■																				
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.22	■																				
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.23	■																				
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.24	■																				
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.18	■																				
Test & Evaluation Milestones: Developmental/Functional Testing:	■																				

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity								Project (Number/Name) 2955 / JEDMICS							
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
Developmental/Functional Testing Release 3.0.19																			
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.20																			
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.21																			
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.22																			
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.23																			
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.24																			
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.18																			
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.19																			
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.20																			
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.21																			

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603739N / Navy Logistic Productivity

Project (Number/Name)

2955 / JEDMICS

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.22																														
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.23																														
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.24																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.17																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.18																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.19																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.20																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.21																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.22																														
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.23																														

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 2955 / JEDMICS		
Schedule Details				
Events by Sub Project		Start	End	
JEDMICS				
Aquisition Milestones: IOC: IOC Release 3.0.17		2	2017	2
Aquisition Milestones: IOC: IOC Release 3.0.18		2	2018	2
Aquisition Milestones: IOC: IOC Release 3.0.19		2	2019	2
Aquisition Milestones: IOC: IOC Release 3.0.20		2	2020	2
Aquisition Milestones: IOC: IOC Release 3.0.21		2	2021	2
Aquisition Milestones: IOC: IOC Release 3.0.22		2	2022	2
Aquisition Milestones: IOC: IOC Release 3.0.23		2	2023	2
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.19		4	2017	4
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.20		4	2018	4
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.21		4	2019	4
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.22		4	2020	4
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.23		4	2021	4
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.24		4	2022	4
Aquisition Milestones: Requirements: Service IPT/ECPs: Service IPT/ECPs Release 3.0.25		4	2023	4
Aquisition Milestones: Contract Award: 2017 Contract Award		1	2017	1
Aquisition Milestones: Contract Award: 2018 Contract Award		1	2018	1
Aquisition Milestones: Contract Award: 2019 Contract Award		1	2019	1

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 2955 / JEDMICS			
Events by Sub Project		Start	End	Quarter	Year
Aquisition Milestones: Contract Award: 2020 Contract Award	1	2020		1	2020
Aquisition Milestones: Contract Award: 2021 Contract Award	1	2021		1	2021
Aquisition Milestones: Contract Award: 2022 Contract Award	1	2022		1	2022
Aquisition Milestones: Contract Award: 2023 Contract Award	1	2023		1	2023
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.18	1	2017		3	2017
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.19	1	2018		3	2018
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.20	1	2019		3	2019
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.21	1	2020		3	2020
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.22	1	2021		3	2021
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.23	1	2022		3	2022
Aquisition Milestones: Software & Hardware Evaluation/Integration: Software Hardware Evaluation/Integration Release 3.0.24	1	2023		3	2023
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.18	3	2017		3	2017
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.19	3	2018		3	2018
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.20	3	2019		3	2019
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.21	3	2020		3	2020
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.22	3	2021		3	2021
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.23	3	2022		3	2022
Test & Evaluation Milestones: Risk Assesment: Risk Assessment Release 3.0.24	3	2023		3	2023
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.18	4	2017		4	2017

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 2955 / JEDMICS			
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.19		4	2018	4	2018
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.20		4	2019	4	2019
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.21		4	2020	4	2020
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.22		4	2021	4	2021
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.23		4	2022	4	2022
Test & Evaluation Milestones: Developmental/Functional Testing: Developmental/Functional Testing Release 3.0.24		4	2023	4	2023
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.18		4	2017	1	2018
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.19		4	2018	1	2019
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.20		4	2019	1	2020
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.21		4	2020	1	2021
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.22		4	2021	1	2022
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.23		4	2022	1	2023
Test & Evaluation Milestones: Alpha/Beta Testing: Alpha/Beta Testing Release 3.0.24		4	2023	4	2023
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.17		2	2017	2	2017
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.18		2	2018	2	2018
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.19		2	2019	2	2019
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.20		2	2020	2	2020
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.21		2	2021	2	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 2955 / JEDMICS		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.22	2	2022	2	2022
Deliveries: Engineering Change Package: Engineering Change Package Release 3.0.23	2	2023	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity				Project (Number/Name) 3223 / Logistics R&D			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3223: <i>Logistics R&D</i>	2.180	0.864	0.604	1.146	-	1.146	1.093	0.977	0.997	1.018	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Stable annual funding is required to facilitate implementation and execution of a robust, flexible Logistics R&D program that will provide the means for Naval Supply Systems Command (NAVSUP) to effectively pursue solutions to mission-related capability and technology gaps. The NAVSUP Logistics R&D program has an established infrastructure and business process for ensuring that R&D funds are applied to projects that address high priority enterprise needs established in accordance with OPNAV goals and the NAVSUP Commander's Guidance.

From a process perspective, Logistics R&D investments are governed by a NAVSUP enterprise-wide Executive Steering Group (ESG) chaired by the NAVSUP Vice Commander, and comprised of SES and Command leadership representatives. The ESG ratifies capability and technology gaps identified by all activities within the enterprise, and then assesses and prioritizes all proposed Logistics R&D initiatives in accordance with their potential for filling the established gap and generating return on investment.

The established Logistics R&D business management process has currently identified capability/technology gaps in the following general areas: 1) the need to develop formalized energy management techniques that focus on energy and resource conservation; increased energy efficiency of new and existing systems and facilities; and increased use of alternative energy products, 2) the need to modernize quality of life (QOL) services to improve overall services, offer additional desired features and reduce total ownership costs, 3) the need to assess clothing protection for the warfighter in areas of thermal/flame threats, protective footwear, and physical (hearing, vibration, etc.) clothing/accessories, 4) the need to develop logistics data access and information sharing through enhanced Graphical User Interfaces (GUI) and web-based data services, 5) the need to develop a capability that allows Integrated Logistics Support (ILS) repair and modernization tools, 6) the need to leverage breakthrough technologies to improve supply chain processing. This modest R&D investment will establish a NAVSUP Logistics R&D Program to explore additional technologies and significantly increase potential cost savings.

The FY 2018 request was reduced by -\$0.351 million to account for the availability of prior year execution balances.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Effective Food Service Management	0.000	0.000	0.185	0.000	0.185
Description: Food Service Management programs and services lack automation and technology which creates inefficiencies and a lack of easy access to the comprehensive information and training required for making informed management decisions impacting both the execution of supporting business processes and providing service to the customer. Capabilities that increase automation of food service business processes, administrative	Articles: -	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 3223 / Logistics R&D	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
requirements, and training. Technologies that automate and incorporate food science initiatives, improve menu production and selections, implement new food service concepts, and improve customers' dining experience including increasing nutritional knowledge and how it factors into overall human performance.				
FY 2018 Plans: N/A				
FY 2019 Base Plans: New focus effort for food service and ashore/afloat galley management in support of reduced manpower requirements. Develop automated solutions for food service processes to improve operations and increase Sailor knowledge of nutrition awareness, and human performance.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: The funding increase from FY 2018 to FY 2019 supports developing effective Food Service Management (FSM) automated solutions to improve FSM operations and human performance, and increase Sailor nutrition awareness knowledge.				
Title: Quality of Life Services Modernization & Cost Reduction (Initiative 1) Articles:				
Description: NAVSUP Quality of Life (QOL) services include subsistence in kind (SIK) food service, retail, postal, laundry, vending, barber shop, household goods and disbursing/Navy Cash, are in many cases inefficient, costly to operate, and lack easy access to the comprehensive information required to make informed management decisions impacting execution of routine supporting business processes. QOL services aims to leverage new technology which will improve support information systems, security, health, etc., and reduce total ownership costs. NAVSUP owns the Food Service Program for the Navy as part of logistics and quality of life programs and is responsible for managing the overall policy including training, food safety, and implementation of "Go for Green" program for the Navy. "Go for Green" is a DoD program that promotes healthful food and beverage choices in order to optimize the performance, readiness, and health of our service members. Future funding may include projects such as new platforms being developed to focus on human performance, physical training and nutrition applications that will be integrated with the "Go for Green" DoD effort.				
FY 2018 Plans:				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 3223 / Logistics R&D				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2019 Base Plans: Leverage Augmented Reality (AR) technology to develop state of the art training modules for Navy Regional Mail Centers (NRMCs) in Norfolk and San Diego which will provide AR training of postal functions that can significantly lower Navy Service-Wide Transportation costs, provide better customer service to shipboard and ashore customers, reduce postal offenses, decrease number of postal inquiries on tracking mail, and improve the Navy's overall corporate knowledge through dramatically improved training.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The funding increase from FY 2018 to FY 2019 supports leveraging Augmented Reality (AR) technology to develop state of the art postal functions training modules for Navy Regional Mail Centers (NRMCs) in Norfolk and San Diego. These training modules can significantly lower Navy Service-Wide Transportation costs, provide better customer service to shipboard and ashore customers, reduce postal offenses, decrease number of postal inquiries on tracking mail, and improve the Navy's overall corporate knowledge through dramatically improved training.						
Title: Quality of Life Services Modernization & Cost Reduction (Initiative 2) Articles:	0.000	0.275	0.250	0.000	0.250	
Description: NAVSUP Quality of Life (QOL) services include subsistence in kind (SIK) food service, retail, postal, laundry, vending, barber shop, household goods and disbursing/Navy Cash, are in many cases inefficient, costly to operate, and lack easy access to the comprehensive information required to make informed management decisions impacting execution of routine supporting business processes. QOL services aims to leverage new technology which will improve support information systems, security, health, etc., and reduce total ownership costs. NAVSUP owns the Food Service Program for the Navy as part of logistics and quality of life programs and is responsible for managing the overall policy including training, food safety, and implementation of "Go for Green" program for the Navy. "Go for Green" is a DoD program that promotes healthful food and beverage choices in order to optimize the performance, readiness, and health of our service members. Future funding may include projects such as new platforms being developed to focus on human performance, physical training and nutrition applications that will be integrated with the "Go for Green" DoD effort.	-	-	-	-	-	
FY 2018 Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 3223 / Logistics R&D				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Enhancing data integration of substance, retail, postal, laundry, vending, barbershop, household, goods to offer additional desired features (such as those which would improve supporting information systems, security, health, etc., and reduce total ownership costs.						
FY 2019 Base Plans: Leveraging new technology, we will continue to develop key educational tools to provide the sailors and their families with healthy lifestyles. Conduct complete Amphibious Ready Group (ARG) and Carrier Strike Group (CSG) predeployment briefs and training.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant change from FY 2018 to FY 2019.						
Title: Readiness through Logistics Solutions Description: Supply chain improvements are required to support logistics efficiency and Fleet readiness through logistics solutions technological improvements. Develop technological capabilities that improve Naval Logistics in part or in its record (from manufacture, storage, delivery, use, maintenance, and disposal).	Articles: - - - -	0.600	0.128	0.268	0.000	0.268
FY 2018 Plans: Finalize Sea Service Deployment Module (SSDM) functionality.						
FY 2019 Base Plans: Application of Next Generation Radio Frequency Identification (RFID) technology in support of Naval Supply Chain Management. Integration of multiple emerging RFID technologies lend themselves to supporting ongoing efforts throughout both the NAVSUP Enterprise and the DON in the following areas: improved Inventory Accuracy (IA) and Asset Visibility (AV), Financial Improvement Audit Readiness (FIAR) support, increased readiness through asset health monitoring, asset movement to alert on possible diversion/counterfeiting risks. The resultant capability will be implemented in a near real time location system (RTLS) manner that provides initial operational test (item temperature, vibration, shock, flow rate, use event/metric) information in conjunction with item movement details while utilizing mesh communications to collect data without needing to implement an expensive infrastructure.						
FY 2019 OCO Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 3223 / Logistics R&D				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
The funding increase from FY 2018 to FY 2019 supports the Application of Next Generation Radio Frequency Identification (RFID) technology in support of Naval Supply Chain Management. Next Generation RFID technologies will improve Inventory Accuracy (IA), Asset Visibility (AV), and Financial Improvement Audit Readiness (FIAR) support, and increase readiness through asset health monitoring and asset movement alerts on possible diversion/counterfeiting risks.						
Title: Clothing Protection for the Warfighter	Articles:	0.264	0.201	0.193	0.000	0.193
Description: Uniforms/protective clothing do not provide comfortable and/or adequate protection for the Warfighter in threat areas such as, thermal/flame, adverse environmental conditions (e.g., heat, cold, rain/snow, water immersion), hazardous chemicals, and physical trauma (hearing, vibration, blunt force, etc.). Further, the physical properties of current uniform items need improvement in the areas of color retention (e.g., reduce fading) and comfort (e.g., reduce weight and optimize moisture management while minimizing care).						
FY 2018 Plans: Identify challenges to effectively manage durability and safety aspects of common work/combat uniforms for the warfighter. Eliminate risk of potential hazardous such as fire, weather, and general wear/tear to maximize readiness and strength in Fleet uniforms. Assist with rollout of the Navy's Type III uniform.						
FY 2019 Base Plans: Leverage opportunities to work joint criteria with sister-services to collect data that will address the deficiencies of current organizational clothing and improve materials and construction methods and design.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: There is no significant change from FY 2018 to FY 2019.						
Accomplishments/Planned Programs Subtotals					0.864	0.604
C. Other Program Funding Summary (\$ in Millions)					1.146	0.000
N/A					1.146	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / <i>Navy Logistic Productivity</i>	Project (Number/Name) 3223 / <i>Logistics R&D</i>
C. Other Program Funding Summary (\$ in Millions)		
<u>Remarks</u>		
D. Acquisition Strategy NAVSUP R&D executed through firm fixed price negotiated contracts and NAVSUP support. Performance-based reviews conducted quarterly by the Project Management Office.		
E. Performance Metrics Development of capability and technology gaps initiatives are monitored quarterly by the NAVSUP R&D Program Management Office.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity				Project (Number/Name) 3223 / Logistics R&D							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Effective Food Service Management	C/FFP	Various : Various	0.000	0.000		0.000		0.185	Dec 2018	-		0.185	Continuing	Continuing	Continuing
Quality of Life Services Modernization & Cost Reduction (Initiative 1)	C/FFP	BSC : Mechanicsburg, PA	0.259	0.000		0.000		0.250	Jan 2019	-		0.250	Continuing	Continuing	Continuing
Quality of Life Services Modernization & Cost Reduction (Initiative 2)	C/FFP	Various : Various	0.785	0.000		0.275	Jan 2018	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Readiness through Logistics Solutions	C/FFP	SSDM : Scott AFB, IL	0.475	0.600	May 2017	0.128	Dec 2017	0.268	Dec 2018	-		0.268	Continuing	Continuing	Continuing
Clothing Protection for the Warfighter	C/FFP	NCTR : Natick, MA	0.661	0.264	Mar 2017	0.201	Dec 2017	0.193	Dec 2018	-		0.193	Continuing	Continuing	Continuing
Subtotal			2.180	0.864		0.604		1.146		-		1.146	Continuing	Continuing	N/A
Remarks				NLP funding of \$864K was dispersed through the following projects: Black Safety Boot, Cold/Wet Weather Clothing Ensemble, these projects will conduct comprehensive research, testing, and evaluations to provide solid result of improvements needed to sustain the Fleet uniform initiatives. Sea Service Deployment Module will modernize a unit move information technology system to facilitate FY15 JROCM mandates, pending IA certification requirements as well as (Naval) forces required use of the force deployment planning and execution business procedures.											
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			2.180	0.864		0.604		1.146		-		1.146	Continuing	Continuing	N/A
Remarks				In previous plans, NAVSUP forecast budget requirements based on projections rooted in the current year's capability gaps. As our priorities and Strategic Guidance evolves so does our budget requirements. Through leveraging new technologies, NAVSUP will enhance efforts for supply ashore and distant support. We will strengthen our supply chain information technology and management solutions for supply and financial requirements. We will collaborate with partners to improve the quality-of-life experiences and expand services to deployed forces. NAVSUP will continue to build an ethical and effective workforce dedicated to the mission by developing new technological programs that are advantageous to the warfighter. We will reduce risk and minimize vulnerabilities to protect against disruptions to supply chain and business systems. All of our actions will follow a culture of moral excellence to successfully execute the current and future missions of NAVSUP.											

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

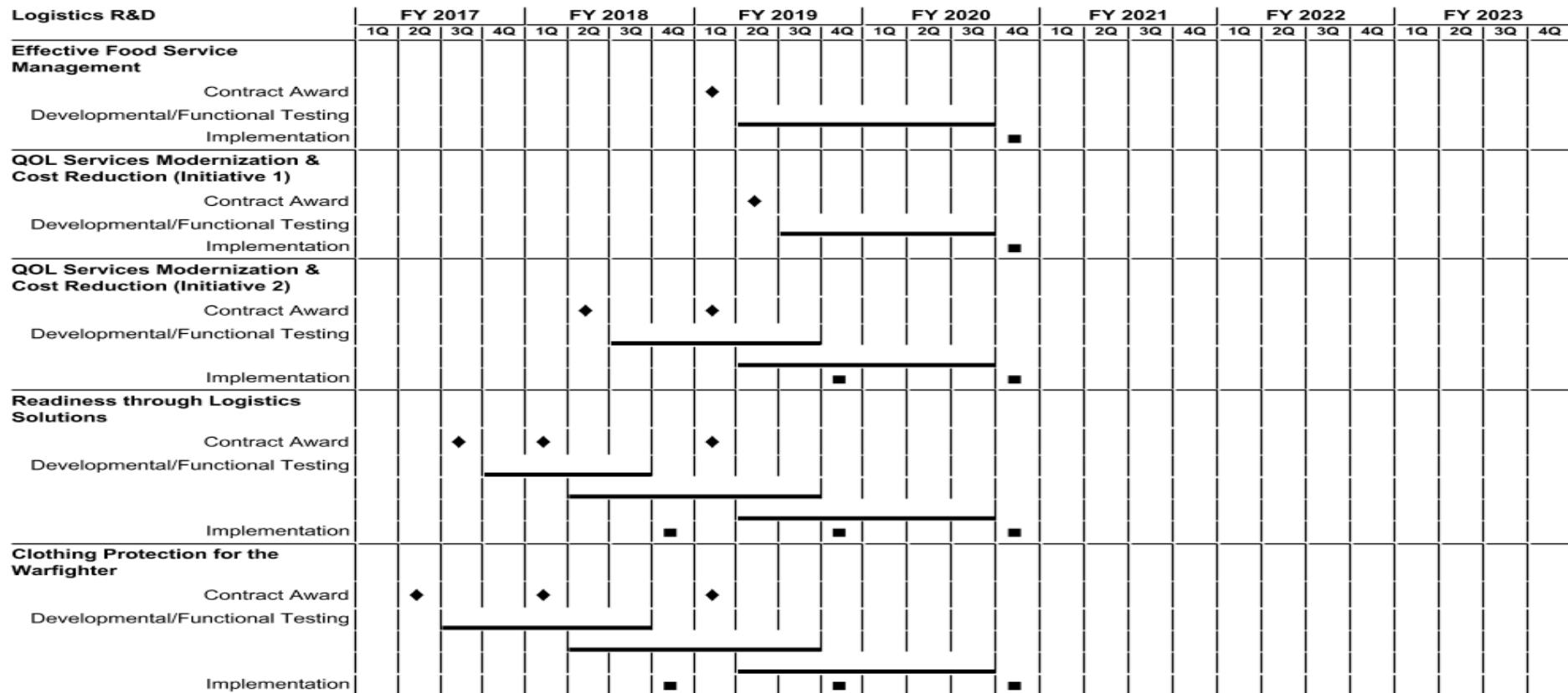
1319 / 4

R-1 Program Element (Number/Name)

PE 0603739N / Navy Logistic Productivity

Project (Number/Name)

3223 / Logistics R&D



2019OSD - 0603739N - 3223

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity		Project (Number/Name) 3223 / Logistics R&D	
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
<i>Logistics R&D</i>				
Effective Food Service Management: Contract Award: FY 2019 Contract Award		1	2019	1
Effective Food Service Management: Developmental/Functional Testing: Developmental/Functional Testing		2	2019	3
Effective Food Service Management: Implementation: Implementation		4	2020	4
QOL Services Modernization & Cost Reduction (Initiative 1): Contract Award: FY 2019 Contract Award		2	2019	2
QOL Services Modernization & Cost Reduction (Initiative 1): Developmental/Functional Testing: Developmental/Functional Testing		3	2019	3
QOL Services Modernization & Cost Reduction (Initiative 1): Implementation: Implementation		4	2020	4
QOL Services Modernization & Cost Reduction (Initiative 2): Contract Award: FY 2018 Contract Award		2	2018	2
QOL Services Modernization & Cost Reduction (Initiative 2): Contract Award: FY 2019 Contract Award		1	2019	1
QOL Services Modernization & Cost Reduction (Initiative 2): Developmental/Functional Testing: FY 2018 Developmental/Functional Testing		3	2018	3
QOL Services Modernization & Cost Reduction (Initiative 2): Developmental/Functional Testing: FY 2019 Developmental/Functional Testing		2	2019	3
QOL Services Modernization & Cost Reduction (Initiative 2): Implementation: FY 2018 Implementation		4	2019	4
QOL Services Modernization & Cost Reduction (Initiative 2): Implementation: FY 2019 Implementation		4	2020	4
Readiness through Logistics Solutions: Contract Award: FY 2017 Contract Award		3	2017	3
Readiness through Logistics Solutions: Contract Award: FY 2018 Contract Award		1	2018	1

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603739N / Navy Logistic Productivity	Project (Number/Name) 3223 / Logistics R&D			
Events by Sub Project		Start		End	
		Quarter	Year	Quarter	Year
Readiness through Logistics Solutions: Contract Award: FY 2019 Contract Award		1	2019	1	2019
Readiness through Logistics Solutions: Developmental/Functional Testing: FY 2017 Developmental/Functional Testing		4	2017	3	2018
Readiness through Logistics Solutions: Developmental/Functional Testing: FY 2018 Developmental/Functional Testing		2	2018	3	2019
Readiness through Logistics Solutions: Developmental/Functional Testing: FY 2019 Developmental/Functional Testing		2	2019	3	2020
Readiness through Logistics Solutions: Implementation: FY 2017 Implementation		4	2018	4	2018
Readiness through Logistics Solutions: Implementation: FY 2018 Implementation		4	2019	4	2019
Readiness through Logistics Solutions: Implementation: FY 2019 Implementation		4	2020	4	2020
Clothing Protection for the Warfighter: Contract Award: FY 2017 Contract Award		2	2017	2	2017
Clothing Protection for the Warfighter: Contract Award: FY 2018 Contract Award		1	2018	1	2018
Clothing Protection for the Warfighter: Contract Award: FY 2019 Contract Award		1	2019	1	2019
Clothing Protection for the Warfighter: Developmental/Functional Testing: FY 2017 Developmental/Functional Testing		3	2017	3	2018
Clothing Protection for the Warfighter: Developmental/Functional Testing: FY 2018 Developmental/Functional Testing		2	2018	3	2019
Clothing Protection for the Warfighter: Developmental/Functional Testing: FY 2019 Developmental/Functional Testing		2	2019	3	2020
Clothing Protection for the Warfighter: Implementation: FY 2017 Implementation		4	2018	4	2018
Clothing Protection for the Warfighter: Implementation: FY 2018 Implementation		4	2019	4	2019
Clothing Protection for the Warfighter: Implementation: FY 2019 Implementation		4	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603746N / (U)RETRACT MAPLE								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	301.871	306.101	377.878	-	377.878	115.281	88.123	78.875	80.757	Continuing	Continuing	
1906: Retract Maple	0.000	301.871	306.101	377.878	-	377.878	115.281	88.123	78.875	80.757	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Previous President's Budget					323.526	306.101	153.613	-	153.613				
Current President's Budget					301.871	306.101	377.878	-	377.878				
Total Adjustments					-21.655	0.000	224.265	-	224.265				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					-	-							
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					-3.200	0.000							
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					-9.488	0.000							
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					0.000	0.000	75.651	-	75.651				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					0.000	0.000	148.614	-	148.614				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					-0.217	-	-	-	-				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 					-8.750	-	-	-	-				
Change Summary Explanation													
Technical: Not applicable.													
Schedule: Not applicable.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603748N / (U)LINK PLUMERIA										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	0.000	259.756	253.675	381.770	-	381.770	370.813	330.228	254.906	236.078	Continuing	Continuing			
1978: Link Plumeria	0.000	259.756	253.675	381.770	-	381.770	370.813	330.228	254.906	236.078	Continuing	Continuing			
A. Mission Description and Budget Item Justification															
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.															
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget					318.497	253.675	334.760	-	334.760						
Current President's Budget					259.756	253.675	381.770	-	381.770						
Total Adjustments					-58.741	0.000	47.010	-	47.010						
• Congressional General Reductions					-	-									
• Congressional Directed Reductions					-	-									
• Congressional Rescissions					-	-									
• Congressional Adds					-	-									
• Congressional Directed Transfers					-	-									
• Reprogrammings					-14.100	0.000									
• SBIR/STTR Transfer					-10.435	0.000									
• Program Adjustments					0.000	0.000	1.388	-	1.388						
• Rate/Misc Adjustments					0.000	0.000	45.622	-	45.622						
• Congressional General Reductions					-0.006	-	-	-	-						
• Congressional Directed Reductions					-34.200	-	-	-	-						
• Congressional Directed Reductions															
Change Summary Explanation															
Technical: Not applicable.															
Schedule: Not applicable.															

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603751N I (U)RETRACT ELM								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	51.720	55.691	60.535	-	60.535	61.189	55.980	53.777	53.964	Continuing	Continuing	
2003: Retract Elm	0.000	51.720	55.691	60.535	-	60.535	61.189	55.980	53.777	53.964	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				52.834	55.691	56.630	-	56.630					
Current President's Budget				51.720	55.691	60.535	-	60.535					
Total Adjustments				-1.114	0.000	3.905	-	3.905					
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments • Rate/Misc Adjustments • Congressional General Reductions 				-	-	-	-	-					
<ul style="list-style-type: none"> Adjustments 				1.200	0.000	6.000	-	6.000					
<ul style="list-style-type: none"> 				-2.002	0.000	-2.095	-	-2.095					
<ul style="list-style-type: none"> 				0.000	0.000	-	-	-					
<ul style="list-style-type: none"> 				0.000	0.000	-	-	-					
<ul style="list-style-type: none"> 				-0.312	-	-	-	-					
Change Summary Explanation													
Technical: Not applicable.													
Schedule: Not applicable.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)									
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603764N / (U)LINK EVERGREEN									
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
Total Program Element	0.000	46.282	48.982	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	95.264		
1972: Link Evergreen	0.000	46.282	48.982	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	95.264		
A. Mission Description and Budget Item Justification														
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.														
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget				48.116	48.982	0.000	-	0.000						
Current President's Budget				46.282	48.982	0.000	-	0.000						
Total Adjustments				-1.834	0.000	0.000	-	0.000						
• Congressional General Reductions				-	-	-	-	-						
• Congressional Directed Reductions				-	-	-	-	-						
• Congressional Rescissions				-	-	-	-	-						
• Congressional Adds				-	-	-	-	-						
• Congressional Directed Transfers				-	-	-	-	-						
• Reprogrammings				-	-	-	-	-						
• SBIR/STTR Transfer				-1.834	0.000	0.000	-	0.000						
• Rate/Misc Adjustments				0.000	0.000	0.000	-	0.000						
Change Summary Explanation														
Technical: Not applicable.														
Schedule: Not applicable.														

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603787N / (U)SPECIAL PROCESSES								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	13.088	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.088	
0116: Linear Tank	0.000	13.088	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.088	
A. Mission Description and Budget Item Justification													
This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.													
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Previous President's Budget					13.619	0.000	0.000	-	0.000				
Current President's Budget					13.088	0.000	0.000	-	0.000				
Total Adjustments					-0.531	0.000	0.000	-	0.000				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					-	-	-	-	-				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					-0.516	0.000	0.000	-	0.000				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					0.000	0.000	0.000	-	0.000				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional General Reductions 					-0.015	-	-	-	-				
Change Summary Explanation													
Technical: Not applicable.													
Schedule: Not applicable.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603790N / NATO Research and Deve										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	72.587	8.567	9.099	9.652	-	9.652	11.121	10.741	10.314	10.528	Continuing	Continuing			
2293: NATO Cooperative R & D	72.587	8.567	9.099	9.652	-	9.652	11.121	10.741	10.314	10.528	Continuing	Continuing			
A. Mission Description and Budget Item Justification															
In accordance with Title 10 United States Code, Section 2350a, this Program Element (PE) provides funding for research and development (R&D) programs with approved allies under international agreements. These funds can only be applied to work efforts in the U.S.. The Under Secretary of Defense, Acquisition and Technology and Logistics (USD, AT&L) must approve each international agreement. The program provides funds for multiple projects under separately approved international agreements as well as funds that support the establishment of such agreements. Each international agreement is summarized in a separate Summary Statement of Intent (SSOI) that also states why the project serves to increase the defense capabilities of the U.S. The SSOI is used to obtain project approval by the Department of the Navy and the Office of the Secretary of Defense.															
The North Atlantic Treaty Organization (NATO) R&D cooperative programs differ from other Research, Development, Test and Evaluation (RDT&E) programs because issuance of funding from this PE coincides with the signature of international agreements. These signatures occur throughout the fiscal year and often encounter unexpected delays during the staffing and negotiation phases of agreement processing prior to signature.															
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget					9.867	9.099	10.772	-	10.772						
Current President's Budget					8.567	9.099	9.652	-	9.652						
Total Adjustments					-1.300	0.000	-1.120	-	-1.120						
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments • Congressional Directed Reductions 					-	-	-	-	-						
Adjustments					0.000	0.000	-1.120	-	-1.120						
					-1.300	-	-	-	-						
Change Summary Explanation															
The FY 2019 funding request was reduced by \$0.977 million to account for the availability of prior year execution balances.															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603790N / NATO Research and Deve				Project (Number/Name) 2293 / NATO Cooperative R & D			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2293: NATO Cooperative R & D	72.587	8.567	9.099	9.652	-	9.652	11.121	10.741	10.314	10.528	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In accordance with Title 10 United States Code, Section 2350a, this Program Element (PE) provides funding for research and development (R&D) programs with approved allies under international agreements. These funds can only be applied to work efforts in the U.S.. The Under Secretary of Defense, Acquisition and Technology and Logistics (USD, AT&L) must approve each international agreement. The program provides funds for multiple projects under separately approved international agreements as well as funds to support the establishment of such agreements. Each international agreement is summarized in a separate Summary Statement of Intent (SSOI) that states how the project serves to increase the defense capabilities of the U.S. The SSOI is used to obtain project approval by the Department of the Navy and the Office of the Secretary of Defense.

North Atlantic Treaty Organization (NATO) R&D cooperative programs differ from other Research, Development, Test and Evaluation (RDT&E) programs because issuance of funding from this PE coincides with the signature of international agreements. These signatures occur throughout the fiscal year and often encounter unexpected delays during the staffing and negotiation phases of agreement processing prior to signature

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Title: NATO Cooperative R & D	Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
		8.567	9.099	9.652	0.000	9.652
FY 2018 Plans:						
<ul style="list-style-type: none"> -Continue to support approved Cooperative projects signed in prior Fiscal Years. -Plan and support approved FY2018 Cooperative projects. <p>Projects include, but are not limited to:</p> <ul style="list-style-type: none"> -Advanced Surveillance Technology (AST) U.S. and Australia -Allied Munitions Detection-Underwater Initiative (ALMOND-U) U.S. and Germany -Arctic Hydrodynamics U.S. and Finland -Autonomous Maritime Asset Protection Systems (AMAPS) U.S. and United Kingdom -Biomimetic Threat Detection System (BTDS) U.S. and United Kingdom -Coalition Underwater Mine and IED Defeat (CUMID) U.S., Canada, and Norway -Collaborative Situational Awareness Development (CSA DEV) U.S. and Italy -Digital Wideband Receiver Signals Intelligence (DWR-SIGINT) U.S. and Australia 						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603790N / NATO Research and Deve	Project (Number/Name) 2293 / NATO Cooperative R & D				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
-Dynamic System Mechanics Advanced Simulation-Shallow Confined Waters (DYSMAS-SCW) U.S. and Germany						
-Electromagnetic Silencing U.S. and United Kingdom						
-Helo Seat Damper U.S. and Canada						
-Hull Treatments U.S. and United Kingdom						
-International Programs Opportunities Engagement Tool (iPoet)						
-Japan U.S. Amphibious Vehicle Technology Cooperation (JUSAV) U.S. and Japan						
-Optical Materials Amendment 1 U.S. and Israel						
-Submarine Superiority U.S. and Australia						
-Superconducting Quantum Small Electromagnetic Sensor System Research and Development (Super QSES) U.S. and Australia						
-Ultra Heavy Lift Amphibious Connector (UHAC) U.S. and Singapore						
-Undersea Surveillance and Communications (USC) U.S. and Sweden						
FY 2019 Base Plans:						
-Continue to support approved Cooperative projects signed in prior fiscal years.						
-Plan and support approved FY2019 Cooperative projects.						
Potential Projects include, but are not limited to:						
-Advanced Structural Monitoring Techniques (ASMT) U.S. and Australia						
-Advanced Surveillance Technology (AST) U.S. and Australia						
-Allied Munitions Detection-Underwater Initiative (ALMOND-U) U.S. and Germany						
-Arctic Hydrodynamics U.S. and Finland						
-Autonomous Maritime Asset Protection Systems (AMAPS) U.S. and United Kingdom						
-Biomimetic Threat Detection System (BTDS) U.S. and United Kingdom						
-Coalition Underwater Mine and IED Defeat (CUMID) U.S., Canada, and Norway						
-Collaborative Situational Awareness Development (CSA DEV) U.S. and Italy						
-Dynamic System Mechanics Advanced Simulation-Shallow Confined Waters (DYSMAS-SCW) U.S. and Germany						
-Electromagnetic Silencing U.S. and United Kingdom						
-Helo Seat Damper U.S. and Canada						
-Hull Treatments U.S. and United Kingdom						
-International Programs Opportunities Engagement Tool (iPoet)						
-Japan U.S. Amphibious Vehicle Technology Cooperation (JUSAV) U.S. and Japan						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603790N / NATO Research and Deve	Project (Number/Name) 2293 / NATO Cooperative R & D	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
-Optical Materials Amendment 1 U.S. and Israel -Submarine Superiority U.S. and Australia -Superconducting Quantum Small Electromagnetic Sensor System Research and Development (Super QSES) U.S. and Australia -Ultra Heavy Lift Amphibious Connector (UHAC) U.S. and Singapore -Undersea Surveillance and Communications (USC) U.S. and Sweden				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Prj. 2293 NUNN has taken several marks for under execution, as a result the program has been promised the funds put back in the FY18 and FY19				
Accomplishments/Planned Programs Subtotals	8.567	9.099	9.652	0.000
C. Other Program Funding Summary (\$ in Millions)	9.652			
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
The intent of the North Atlantic Treaty Organization (NATO) cooperative R&D program is to provide initial funds for projects seeking allied contributions into cooperative research and development projects with the U.S. The primary metric used in the program is foreign contributions into projects supported by the program. The performance goal is met if total foreign contributions into projects exceed total NATO cooperative R&D program funds by over 100%.				
This program historically does not meet established execution benchmarks. The North Atlantic Treaty Organization (NATO) R&D cooperative programs differ from other Research, Development, Test and Evaluation (RDT&E) programs because issuance of funding from this PE coincides with the signature of international agreements. These signatures occur throughout the fiscal year and often encounter unexpected delays during the staffing and negotiation phases of agreement processing prior to signature.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603790N / NATO Research and Deve					Project (Number/Name) 2293 / NATO Cooperative R & D					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test and Evaluation	C/FP	NAVSEA : Washington Navy Yard, DC	26.126	0.500	Jan 2017	0.250	Apr 2018	0.669	Dec 2018	-		0.669	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	NSWC : West Bethesda, MD	13.621	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	NUWC : Newport, RI	2.352	0.000		0.525	Dec 2017	0.300	Dec 2018	-		0.300	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	SPAWAR : San Diego, CA	4.853	0.500	Dec 2016	0.818	Apr 2018	1.000	Jan 2019	-		1.000	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	NAVAIR : Patuxent River, MD	2.136	0.000		2.004	Dec 2017	0.353	Dec 2018	-		0.353	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	NRL : Washington, DC	2.484	0.000		1.512	Oct 2017	1.830	Nov 2018	-		1.830	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	NAWC : Point Mugu, CA	6.100	1.000	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	Miscellaneous : Washington Navy Yard	9.531	6.192	Apr 2017	1.170	Mar 2018	1.500	Apr 2019	-		1.500	Continuing	Continuing	Continuing
Developmental Test and Evaluation	C/FP	MARCOR : Washington.DC	1.200	0.000		0.000		0.000		-		0.000	0.000	1.200	-
Developmental Test and Evaluation	C/FP	NSWCCD : Carderock, MD	2.035	0.000		0.900	May 2018	0.625	Apr 2019	-		0.625	0.000	3.560	-
Developmental Test and Evaluation	C/FP	ONR : Arlington, VA	2.100	0.375	May 2017	0.000		0.775	Mar 2019	-		0.775	0.000	3.250	-
Developmental Test and Evaluation	C/FP	USMC : Quantico VA	0.000	0.000		0.000		0.500	May 2019	-		0.500	0.000	0.500	-
Developmental Test and Evaluation	C/FP	NSWC : Indian Head, MD	0.000	0.000		0.250	Jan 2018	0.000		-		0.000	0.000	0.250	-
Developmental Test and Evaluation	C/FP	NSWC : Panama City , FL	0.000	0.000		0.250	Dec 2017	0.200	Oct 2018	-		0.200	0.000	0.450	-
Developmental Test and Evaluation	C/FP	GSA : Washington, DC	0.000	0.000		0.400	Feb 2018	0.400	Mar 2019	-		0.400	0.000	0.800	-
Developmental Test and Evaluation	C/FP	DISA : Ft Meade MD	0.000	0.000		0.000		1.500	Dec 2018	-		1.500	0.000	1.500	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603790N / NATO Research and Deve				Project (Number/Name) 2293 / NATO Cooperative R & D								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test and Evaluation	C/FP	CDSA : Dam Neck, VA	0.000	0.000		1.020	Mar 2018	0.000		-		0.000	0.000	1.020	-	
			Subtotal	72.538	8.567		9.099		9.652		-		9.652	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
ACQ Workforce Fund	Various	Various : Various	0.049	0.000		0.000		0.000		-		0.000	0.000	0.049	-	
			Subtotal	0.049	0.000		0.000		0.000		-		0.000	0.000	0.049	N/A
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
			Project Cost Totals	72.587	8.567		9.099		9.652		-		9.652	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018
Appropriation/Budget Activity				R-1 Program Element (Number/Name)								Project (Number/Name)				
1319 / 4				PE 0603790N / NATO Research and Deve								2293 / NATO Cooperative R & D				
				FY 2017				FY 2018				FY 2019				FY 2020
				1	2	3	4	1	2	3	4	1	2	3	4	1
Proj 2293																
International Agreements				[REDACTED]												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603790N / NATO Research and Deve	Project (Number/Name) 2293 / NATO Cooperative R & D	
Schedule Details			
Events by Sub Project		Start	End
<i>Proj 2293</i>		Quarter	Year
International Agreements		1	2017
		4	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603795N / Land Attack Tech							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	15.471	17.260	35.668	15.529	1.400	16.929	0.000	0.000	0.000	0.000	0.000	85.328
2020: Advanced Gun System Projectile	0.000	0.000	18.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.000
2038: ADVANCED MINOR CALIBER GUN	15.471	1.073	2.100	0.000	1.400	1.400	0.000	0.000	0.000	0.000	0.000	20.044
3370: Railgun	0.000	4.581	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.581
3401: Guided Projectile	0.000	0.000	15.568	15.529	-	15.529	0.000	0.000	0.000	0.000	0.000	31.097
9999: Congressional Adds	0.000	11.606	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.606

A. Mission Description and Budget Item Justification

Project 2020: The Advanced Gun System (AGS) projectile will provide Naval Surface Fires support for DDG 1000 class destroyers from the MK-51 Gun Weapon System (GWS). The AGS projectile will replace the Long Range Land Attack Projectile which was the original 155mm munitions developed for the MK-51 GWS. The development effort focuses on integration of a 155mm guided projectile in the MK-51 GWS which includes modifications to address initialization, dimensional, gun launch, and automated handling interface differences. Components affected by the integration of a 155mm guided projectile include the guided projectile, the propelling charge, the MK-51 Gun Weapon System, and the Total Ship Computing Environment. The program was funded under PE 0204202N DDG 1000 in FY 2017. The capability is planned for Initial Operational Capability in 4QFY2021. This is not a new start.

Project 2038: The Advanced Minor Caliber Gun supported non-recurring engineering, component integration, and testing efforts required for capability upgrades to the MK38 Mod 2, a minor caliber gun weapon system.

Project 2038 OCO: In order to respond to the Joint Urgent Operational Need (JUONs CC-0558) Counter Unmanned Aerial Systems (CUAS), the MK 38 MOD 2 Machine Gun System will be upgraded to counter these threats. Fielding is expected to start 1st quarter FY20.

Projects 3370 & 3401: The Gun Launched Guided Projectile effort will double the range of the current 5-inch conventional ammunition while meeting multi-mission operational requirements for Anti-Surface Warfare (ASuW), Anti-Air Warfare (AAW), and Naval Surface Fire Support (NSFS) missions. This project executes pre milestone (MS) B activities and begins preparations for the Engineering, Manufacturing, and Development Phase planned for FY 2020. This includes development of system specifications and interface control documents to support MS B. Maturation of subcomponents and integration risk reduction efforts will be initiated to support MS B Acquisition Milestone and Competitive E&MD Award. The Gun Launched Guided Projectile project was previously funded under the PE 0603925N / Directed Energy and Electronic Weapon Systems (Proj: 3370 Railgun) and 0603795N / Land Attack Tech (Proj: 3370 Railgun). This is not a new start.

Proj 9999: The objective is to demonstrate a 5-inch guided projectile capable of conducting Naval Surface Fire Support missions to a range of not less than 26 nautical miles (nmi). Priority consideration will be given to mature designs capable of achieving qualification for fleet introduction in the near term.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603795N / Land Attack Tech			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	6.015	33.568	43.713	-	43.713
Current President's Budget	17.260	35.668	15.529	1.400	16.929
Total Adjustments	11.245	2.100	-28.184	1.400	-26.784
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.300	0.000			
• SBIR/STTR Transfer	-0.455	0.000			
• Program Adjustments	0.000	2.100	-27.713	-	-27.713
• Rate/Misc Adjustments	0.000	0.000	-0.471	1.400	0.929
• Congressional Add Adjustments	12.000	-	-	-	-
Congressional Add Details (\$ in Millions, and Includes General Reductions)					
Project: 9999: Congressional Adds					
Congressional Add: Fly Off Competition					
					FY 2017
					11.606
					0.000
					11.606
					0.000
					11.606
					0.000
					11.606
					0.000
					11.606
					0.000
Change Summary Explanation					
Increase of +\$11.606M supports 5-inch guided projectile demonstration.					
Decrease of -.800M due to BTR from project 3370 Railgun in FY17.					
Decrease of -.191M due to Efficiency reduction from project 3401 Guided Projectile in FY19.					
Decrease of -\$165.206M removed from project 3401 Guided Projectile through fiscal years 19-22.					
Increase of \$4.0M FY17(\$0.5M baseline), FY18 (\$2.1M OCO) & FY19 (\$1.4M OCO) for project 2038 Urgent Operational Need for defense against Unmanned Aerial Systems (UAS).					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 2020 / Advanced Gun System Projectile				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2020: Advanced Gun System Projectile		0.000	0.000	18.000	0.000	-	0.000	0.000	0.000	0.000	0.000	18.000	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification													
The Advanced Gun System (AGS) projectile will provide affordable Naval Surface Fires Support for DDG 1000 class destroyers from the MK 51 Gun Weapon System (commonly referred to as AGS). Initiation of a demonstration and development planning for an affordable round was directed by Assistant Secretary of the Navy, Research, Development, and Acquisition to address the unaffordability of the Long Range Land Attack Projectile. The effort focuses on integration of an affordable 155mm guided projectile in the MK 51 GWS and includes modifications to address initialization, dimensional, gun launch, and automated handling interface differences. Components affected by the integration of an affordable 155mm guided projectile include the guided projectile, the propelling charge, the MK 51 Gun Weapon System, and the Total Ship Computing Environment. The program is funded under PE 0204202N DDG 1000 in FY 2017. Initial Operational Capability is planned for 4QFY2021.													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
<i>Title:</i> Systems Engineering and Design Verification										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
<i>Articles:</i>										0.000	18.000	0.000	0.000
<i>FY 2018 Plans:</i>										-	-	-	-
Baseline Interface Control Documents													
Baseline system specification for a 155mm guided projectile													
Initiate modifications to the guided projectile to support interface requirements													
Begin design on MK-51 Gun Weapon System modifications													
Begin design verification testing on MK-51 Gun Weapon System modifications													
Begin design verification testing for an alternate propelling charge system													
Complete alternate logical and electrical Critical Design Review for initialization conversion													
Complete a technology transfer to industry for the electrical and logical interface conversion													
Initiate development on system integration modifications													
<i>FY 2019 Base Plans:</i>													
N/A													
<i>FY 2019 OCO Plans:</i>													
N/A													
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i>													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603795N / <i>Land Attack Tech</i>		Project (Number/Name) 2020 / <i>Advanced Gun System Projectile</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017 FY 2018 FY 2019 Base FY 2019 OCO FY 2019 Total		
Decrease due to Advanced Gun System not being funded past FY 2018.							
Accomplishments/Planned Programs Subtotals					0.000 18.000 0.000 0.000 0.000		
C. Other Program Funding Summary (\$ in Millions)							
N/A							
Remarks							
D. Acquisition Strategy Projectile decision based on capability, cost, technology maturity, and ability to support DDG-1000 Initial Operational Capability schedule.							
E. Performance Metrics Development cost, unit cost, Initial Operational Capability schedule.							

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech					Project (Number/Name) 2020 / Advanced Gun System Projectile					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Guided Projectile Modification Development	C/CPFF	TBD : Not Specified	0.000	0.000		3.200	Dec 2017	0.000		-		0.000	39.502	42.702	-
Propelling Charge Development	C/CPFF	BAE Systems : Fridley, MN	0.000	0.000		2.655	Dec 2017	0.000		-		0.000	9.148	11.803	-
Munitions Container Development	C/CPFF	BAE Systems : Fridley, MN	0.000	0.000		2.100	Dec 2017	0.000		-		0.000	3.540	5.640	-
Munition Container Modification Development, Electrical	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.365	Oct 2017	0.000		-		0.000	0.200	0.565	-
Munitions Container and Propelling Charge Technical Data Package Modification	WR	NSWC IHEODTD : Picatinny, NJ	0.000	0.000		0.241	Oct 2017	0.000		-		0.000	0.246	0.487	-
Munitions Container and Propelling Charge Technical Data Package Modification	WR	NSWC CN : Corona, CA	0.000	0.000		0.075	Oct 2017	0.000		-		0.000	0.080	0.155	-
MK 51 Munition Container Modification Development, Software	MIPR	ARDEC : Picatinny, NJ	0.000	0.000		0.250	Oct 2017	0.000		-		0.000	0.100	0.350	-
MK 51 GWS Modification Development	C/CPFF	BAE Systems : Fridley, MN	0.000	0.000		5.068	Dec 2017	0.000		-		0.000	19.932	25.000	-
Total Ship Computing Environment Modification Development	C/CPFF	Raytheon IDS : Tewksbury, MA	0.000	0.000		0.000		0.000		-		0.000	15.000	15.000	-
Subtotal			0.000	0.000		13.954		0.000		-		0.000	87.748	101.702	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Services Engineering	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.780	Oct 2017	0.000		-		0.000	1.251	2.031	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech					Project (Number/Name) 2020 / Advanced Gun System Projectile					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Services Engineering	WR	NSWC IHEOTD : Indian Head MD	0.000	0.000		0.790	Oct 2017	0.000		-		0.000	1.128	1.918	-
Government Services Engineering	WR	NSWC IHEOTD : Picatinny, NJ	0.000	0.000		0.626	Oct 2017	0.000		-		0.000	1.144	1.770	-
Government Services Engineering	WR	NAWC,CL : China Lake, CA	0.000	0.000		0.100	Oct 2017	0.000		-		0.000	0.181	0.281	-
Subtotal			0.000	0.000		2.296		0.000		-		0.000	3.704	6.000	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Analysis and Articles	MIPR	USAASC : Picatinny, NJ	0.000	0.000		0.500	Oct 2017	0.000		-		0.000	4.704	5.204	-
Test Range	MIPR	Dugway Proving Grounds : Dugway, UT	0.000	0.000		0.450	Oct 2017	0.000		-		0.000	0.900	1.350	-
Test Range	MIPR	Yuma Proving Grounds : Yuma, AZ	0.000	0.000		0.180	Oct 2017	0.000		-		0.000	0.300	0.480	-
Test Range	WR	Dahlgren Range : Dahlgren, VA	0.000	0.000		0.320	Oct 2017	0.000		-		0.000	1.269	1.589	-
Test Range	WR	White Sands Missile Range : White Sands, NM	0.000	0.000		0.000		0.000		-		0.000	0.900	0.900	-
Test Range	WR	NSWC IHEODTD : Picatinny, NJ	0.000	0.000		0.000		0.000		-		0.000	0.575	0.575	-
Subtotal			0.000	0.000		1.450		0.000		-		0.000	8.648	10.098	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 2020 / Advanced Gun System Projectile						
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Support Services	C/CPFF	CACI : Arlington, VA	0.000	0.000		0.300	Oct 2017	0.000		-		0.000	0.900	1.200	-
Subtotal			0.000	0.000		0.300		0.000		-		0.000	0.900	1.200	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		18.000		0.000		-		0.000	101.000	119.000	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018										
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech								Project (Number/Name) 2020 / Advanced Gun System Projectile												
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023									
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
Proj 2020																									
Guided Projectile Modification Development																									
Propelling Charge Development																									
Munitions Container Modification Development																									
MK 51 GWS Development																									
Propelling Charge Qual, DT/FOTE hardware award																									

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech	Project (Number/Name) 2020 / Advanced Gun System Projectile		
Schedule Details				
Events by Sub Project		Start	End	
Proj 2020		Quarter	Year	Quarter
Guided Projectile Modification Development		1	2018	4
Propelling Charge Development		1	2018	4
Munitions Container Modification Development		1	2018	4
MK 51 GWS Development		1	2018	4
Propelling Charge Qual, DT/FOTE hardware award		2	2018	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 2038 / ADVANCED MINOR CALIBER GUN				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2038: ADVANCED MINOR CALIBER GUN	15.471	1.073	2.100	0.000	1.400	1.400	0.000	0.000	0.000	0.000	0.000	20.044	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Minor Caliber Gun project supported non-recurring engineering, component integration, testing and qualification efforts required for the capability upgrades to the MK 38 MOD 2, a minor caliber gun weapon system. The new configuration (MOD 3) creates a near term improvement to address ship based, close range solutions to defeat the Fast Attack Craft (FAC)/Fast In-Shore Attack Craft (FIAC) threat. The MK 38 MOD 2 was developed in FY 2004 to outfit near term deployers to counter small boat threats.

OCO: In order to respond to the Joint Urgent Operational Need (CC-0558) for Counter Unmanned Aerial Systems (CUAS), the MK 38 MOD 2 Machine Gun System will be upgraded to counter these threats. Both FY2018 and FY2019 funding in OCO supports the modifications for this requirement. Fielding is expected to start 1st quarter FY20.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Systems Engineering and Testing FY 2018 Plans: Begin development of system requirements and specifications. Begin development and incremental testing of Counter-Unmanned Aerial System (C-UAS) software upgrade. Procure Engineering Prototype Hardware Develop Introductory Safety Review Board package for Weapon System Explosives Safety Review Board Concurrence. FY 2019 Base Plans: N/A FY 2019 OCO Plans: - Delivery of final Counter-UAS capability software release - Complete land-based and at-sea qualification testing - Obtain WSESRR concurrence for deployment - Obtain element certification of new MK 38 HW/W baseline	1.073	2.100	0.000	1.400	1.400

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech	Project (Number/Name) 2038 / ADVANCED MINOR CALIBER GUN				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Field engineering design model for Initial Operational Capability						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY2019 due to nearing completion of efforts supporting Joint Urgent Operational Need (CC-0558) for Counter Unmanned Aerial Systems (CUAS).						
Accomplishments/Planned Programs Subtotals		1.073	2.100	0.000	1.400	1.400
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy Hardware improvement based on engineering changes was integrated into FY 2017 and follow-on production orders.						
E. Performance Metrics Quarterly program reviews and semi-annual product certification panel reviews.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech					Project (Number/Name) 2038 / ADVANCED MINOR CALIBER GUN						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Primary Product Integration	SS/BOA	BAE Systems : Minneapolis MN	12.062	0.663	Apr 2017	1.500	Mar 2018	0.000		0.500	Nov 2018	0.500	0.000	14.725	-	
			Subtotal	12.062	0.663		1.500		0.000		0.500		0.500	0.000	14.725	N/A
Remarks ECPs spiral development - Electro Optical Site (EOS) capabilities																
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Engineering Services	WR	NSWC, DD : Dahlgren, VA	2.406	0.343	Jan 2017	0.200	Mar 2018	0.000		0.500	Nov 2018	0.500	0.000	3.449	-	
Government Engineering Services	WR	NSWC, IHD : Picatinny, NJ	0.638	0.002	Oct 2017	0.200	Mar 2018	0.000		0.200	Nov 2018	0.200	0.000	1.040	-	
Government Engineering Seervices	WR	NSWC, CR : Crane, IN	0.000	0.065	Oct 2017	0.200	Mar 2018	0.000		0.200	Nov 2018	0.200	0.000	0.465	-	
			Subtotal	3.044	0.410		0.600		0.000		0.900		0.900	0.000	4.954	N/A
Remarks Configuration Management (CM) work engineering tech manuals updates.																
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Support Services	C/CPFF	ALION : Washington, DC	0.365	0.000		0.000		0.000		-		0.000	0.000	0.365	-	
			Subtotal	0.365	0.000		0.000		0.000		-		0.000	0.000	0.365	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 2038 / ADVANCED MINOR CALIBER GUN					
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.471	1.073		2.100		0.000		1.400	1.400	0.000	20.044	N/A
Remarks												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity
1319 / 4R-1 Program Element (Number/Name)
PE 0603795N / Land Attack TechProject (Number/Name)
2038 / ADVANCED MINOR CALIBER GUN

2038 / Advance Minor Caliber Gun Program Schedule

ID	Task Name	2016				2017				2018				2019				2020				2021				2022			
		Q1	Q2	Q3	Q4																								
1	MK 38 MOD 3 (Increment II)																												
2	Qualification Test																												
3	ECPs Based on Sea Trials																												

ID	Task Name	2016				2017				2018				2019				2020				2021				2022			
		Q1	Q2	Q3	Q4																								
1	MK38 MG S CUAS Upgrade																												
2	Requirements Development																												
3	Design Development																												
4	Final SW Release																												
5	Qualification Testing																												
6	Safety & Certification																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / <i>Land Attack Tech</i>	Project (Number/Name) 2038 / <i>ADVANCED MINOR CALIBER GUN</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2038				
Increment II Qualification Test	1	2017	3	2017
Engineering Changes based on Sea Trials	3	2017	4	2017
Requirements and Design Development	1	2018	4	2018
Final SW Release Counter (UAS)	3	2018	2	2019
Qualification Testing	1	2019	4	2019
Safety and Element Certification	3	2019	3	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 3370 / Railgun			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3370: Railgun		0.000	4.581	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	4.581
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

A. Mission Description and Budget Item Justification

The Hyper Velocity Projectile Block (BLK) 0 will double the range of the current 5-inch conventional ammunition to support multi-mission operational requirements for Anti-Surface Warfare (ASuW), Anti-Air Warfare (AAW), and Naval Surface Fire Support (NSFS) missions. This project executes pre Milestone B (MS B) activities and begins preparations for the Engineering, Manufacturing, and Development Phase planned for FY 2019. This includes development of the system specification and interfaces, and support Hyper Velocity Projectile risk reduction efforts required to transition to Milestone B (MS B). The Hyper Velocity Projectile project was previously funded under the PE 0603925N / Directed Energy and Electronic Weapon Systems.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Systems Engineering and Testing	4.581	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2018 Plans: FY 2018 plans is funded under project 3401: Guided Projectile.					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: No change from FY 2018 to FY 2019.					
Accomplishments/Planned Programs Subtotals	4.581	0.000	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Leveraging the ONR sponsored Future Naval Capabilities project, SCO activities, and Gov't developed Interface Control Drawings and specifications to establish a competitive solicitation for E&MD Phase in FY 2020.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / <i>Land Attack Tech</i>	Project (Number/Name) 3370 / <i>Railgun</i>
E. Performance Metrics Quarterly Program Reviews, Monthly Reports, and Periodic Design Reviews.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech					Project (Number/Name) 3370 / Railgun					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Services	WR	NSWC, DD : Dahlgren, VA	0.000	3.671	Jan 2017	0.000		0.000		-		0.000	0.000	3.671	-
Government Engineering Services	WR	NSWC, Indian Head : Indian Head, MD	0.000	0.250	Oct 2016	0.000		0.000		-		0.000	0.000	0.250	-
Government Engineering Services	WR	NSWC IHD Picatinny Detachment : Picatinny Arsenal, NJ	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Government Engineering Services	MIPR	COTF/MCOTEA : Norfolk, VA	0.000	0.039	Dec 2016	0.000		0.000		-		0.000	0.000	0.039	-
HVP Tactical Development Risk Reduction Studies/Analysis	C/CPFF	DOTC Competitively Selected Vendor: TBD : L3	0.000	0.116	Jan 2017	0.000		0.000		-		0.000	0.000	0.116	-
Program Support Services	C/CPFF	MITRE : McLean, VA	0.000	0.350	Jul 2017	0.000		0.000		-		0.000	0.000	0.350	-
Subtotal			0.000	4.426		0.000		0.000		-		0.000	0.000	4.426	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypervelocity Projectile	WR	NSWC PHD : Pt. Hueneme, CA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
WNY Front Office Corp Ops	C/CPFF	NAVSEA : WNY	0.000	0.141	Jul 2017	0.000		0.000		-		0.000	0.000	0.141	-
Cancelled Accounts	C/CPFF	NAVSEA : WNY	0.000	0.014	Jul 2017	0.000		0.000		-		0.000	0.000	0.014	-
Subtotal			0.000	0.155		0.000		0.000		-		0.000	0.000	0.155	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 3370 / Railgun						
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
	Project Cost Totals	0.000	4.581		0.000		0.000		-	0.000	0.000	4.581	N/A
Remarks													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)								
1319 / 4				PE 0603795N / Land Attack Tech								3370 / Railgun												
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023								
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Proj 3370																								
Technical Studies/Risk Reduction effort																								
System Engineering Plan (SEP) Development																								
MS B Documentation																								
System Spec and Interface Requirement																								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech	Project (Number/Name) 3370 / Railgun		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Proj 3370				
Technical Studies/Risk Reduction effort		1	2017	4
System Engineering Plan (SEP) Development		1	2017	4
MS B Documentation		1	2017	1
System Spec and Interface Requirement		1	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 3401 / Guided Projectile			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3401: <i>Guided Projectile</i>	0.000	0.000	15.568	15.529	-	15.529	0.000	0.000	0.000	0.000	0.000	31.097
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

Note

Decrease of \$263K a result of OSD Budgetary PBD/RMD Adjustments and DON Leadership Decisions results in decrease in DOTC funded amount.

A. Mission Description and Budget Item Justification

The Gun Launched Guided Projectile effort will double the range of the current 5-inch conventional ammunition while meeting multi-mission operational requirements for Anti-Surface Warfare (ASuW), Anti-Air Warfare (AAW), and Naval Surface Fire Support (NSFS) missions. This project executes pre milestone (MS) B activities and begins preparations for the Engineering, Manufacturing, and Development Phase planned for FY 2020. This includes development of system specifications and interface control documents to support MS B. Maturation of subcomponents and integration risk reduction efforts will be initiated to support MS B Acquisition Milestone and Competitive E&MD Award. The Gun Launched Guided Projectile project was previously funded under the PE 0603925N / Directed Energy and Electronic Weapon Systems (Proj: 3370 Railgun) and 0603795N / Land Attack Tech (Proj: 3370 Railgun). This is not a new start.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
0.000	15.568	15.529	0.000	15.529

Title: Systems Engineering and Testing

Articles:

0.000	15.568	15.529	0.000	15.529
-	-	-	-	-

FY 2018 Plans:

Continue development of Mechanical and Electrical Interface Control Documentation (ICDs).
 Continue Tactical Subcomponent Risk Reduction Development Efforts.
 Test MK 45 Mod 4 Initialization and Gun Mount Prototypes verifying interfaces and specifications.
 Develop documentation required for MS B Entrance Criteria.
 Continue Risk Reduction Studies.
 Develop System Architecture for Combat System Integration.

FY 2019 Base Plans:

Finalize and publish Request for Proposals for Engineering, Manufacturing, and Development award.
 Evaluate technical and cost proposals.
 Complete development of Mechanical and Electrical Interface Control Documentation (ICDs)
 Complete documentation required for MS B Entrance Criteria.
 Continue Tactical Subcomponent Risk Reduction Development Efforts.
 Continue to develop System Architecture for Combat System Integration.

FY 2019 OCO Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018					
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech		Project (Number/Name) 3401 / Guided Projectile					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
N/A									
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.									
Accomplishments/Planned Programs Subtotals					0.000	15.568	15.529	0.000	15.529
C. Other Program Funding Summary (\$ in Millions)									
N/A									
Remarks									
D. Acquisition Strategy									
Leveraging the ONR sponsored Future Naval Capabilities project, SCO activities, and Gov't developed Interface Control Drawings and specification to establish a competitive solicitation for Engineering & Manufacturing Development (E&MD) Phase.									
E. Performance Metrics									
Quarterly Program Reviews, Monthly Reports, and Periodic Design Reviews.									

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech					Project (Number/Name) 3401 / Guided Projectile					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Services	WR	NSWC Indian Head : Indian Head, MD	0.000	0.000		0.308	Nov 2017	0.455	Oct 2018	-		0.455	0.000	0.763	-
Projectile Tactical Development	WR	DOTC Competitively Selected Commercial Vendor : Picatinny, NJ	0.000	0.000		5.375	Dec 2017	6.581	Oct 2018	-		6.581	0.000	11.956	-
CSEA Integration	C/CPFF	Lockheed Martin : Minneapolis, MN	0.000	0.000		1.000	Nov 2017	1.068	Oct 2018	-		1.068	0.000	2.068	-
Subtotal			0.000	0.000		6.683		8.104		-		8.104	0.000	14.787	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Services	WR	NSWC DD : Dahlgren, VA	0.000	0.000		4.825	Oct 2017	5.150	Oct 2018	-		5.150	0.000	9.975	-
Analysis of Alternatives	C/CPFF	CACI : Arlington, VA	0.000	0.000		2.000	Nov 2017	0.000		-		0.000	0.000	2.000	-
Government Engineering Services	WR	COTF/MCOTEA : Norfolk, VA	0.000	0.000		0.290	Nov 2017	0.290	Oct 2018	-		0.290	0.000	0.580	-
Program Support Services	C/CPFF	MITRE : McLean, VA	0.000	0.000		0.350	Nov 2017	0.450	Oct 2018	-		0.450	0.000	0.800	-
Program Support Services	C/CPFF	JHU/APL : Baltimore, MD	0.000	0.000		0.300	Oct 2017	0.300	Oct 2018	-		0.300	0.000	0.600	-
Subtotal			0.000	0.000		7.765		6.190		-		6.190	0.000	13.955	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
IWS 3.0 Support	C/CPFF	TMB, CACI, Alion : Arlington, VA	0.000	0.000		1.120	Oct 2017	1.235	Oct 2018	-		1.235	0.000	2.355	-
Subtotal			0.000	0.000		1.120		1.235		-		1.235	0.000	2.355	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 3401 / Guided Projectile						
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
	Project Cost Totals	0.000	0.000	15.568		15.529		-		15.529	0.000	31.097	N/A
Remarks													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018							
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)							
1319 / 4				PE 0603795N / Land Attack Tech								3401 / Guided Projectile											
				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 3401																							
Risk Reduction Studies																							
Technical Studies/Risk Reduction effort																							
System Engineering Plan (SEP) Development																							
Test & Evaluation Mastr Plan (TEMP) Development																							
Milestone B Decision																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech	Project (Number/Name) 3401 / Guided Projectile		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Proj 3401				
Risk Reduction Studies		1	2017	4
Technical Studies/Risk Reduction effort		1	2017	4
System Engineering Plan (SEP) Development		1	2017	2
Test & Evaluation Mastr Plan (TEMP) Development		1	2017	1
Milestone B Decision		4	2019	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech				Project (Number/Name) 9999 / Congressional Adds			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
9999: Congressional Adds	0.000	11.606	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.606
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

A. Mission Description and Budget Item Justification

The objective is to demonstrate a 5-inch guided projectile capable of conducting Naval Surface Fire Support missions to a range of not less than 26 nautical miles (nmi). Priority consideration will be given to mature designs capable of achieving qualification for fleet introduction in the near term.

B. Accomplishments/Planned Programs (\$ in Millions)

<i>Congressional Add:</i> Fly Off Competition	FY 2017	FY 2018
FY 2017 Accomplishments: -Select qualified vendors via a Broad Agency Announcement. -Award multiple contracts. -Obtain prototype projectiles. -Conduct land-based demonstration testing of guided munitions. -Review data and document results.	11.606	0.000
FY 2018 Plans: N/A		
Congressional Adds Subtotals	11.606	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Competitively select qualified vendors to conduct demonstrations.

E. Performance Metrics

Flight Test Readiness Reviews & Test Reports.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018					
Appropriation/Budget Activity 1319 / 4													R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech					
Project (Number/Name) 9999 / Congressional Adds																		
Product Development (\$ in Millions)																		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Production of test flight hardware	C/FFP	TBD : TBD	0.000	8.090	Feb 2018	0.000		0.000		-		0.000	0.000	8.090	-			
Subtotal				0.000	8.090		0.000		0.000		-		0.000	0.000	8.090	N/A		
Support (\$ in Millions)																		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Navy Tech Team	WR	NSWC, IH : Picatinny Arsenal, NJ	0.000	0.669	Dec 2017	0.000		0.000		-		0.000	0.000	0.669	-			
Subtotal				0.000	0.669		0.000		0.000		-		0.000	0.000	0.669	N/A		
Test and Evaluation (\$ in Millions)																		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Range Test Support	WR	NSWC DD : Dahlgren, VA	0.000	0.206	Jan 2018	0.000		0.000		-		0.000	0.000	0.206	-			
Test Range	WR	White Sands Missle Range : WhiteSands, NM	0.000	2.641	Jan 2018	0.000		0.000		-		0.000	0.000	2.641	-			
Subtotal				0.000	2.847		0.000		0.000		-		0.000	0.000	2.847	N/A		
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals				0.000	11.606		0.000		0.000		-		0.000	0.000	11.606	N/A		
Remarks																		

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)								
1319 / 4				PE 0603795N / Land Attack Tech								9999 / Congressional Adds												
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023								
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Proj 9999																								
Broad Agency Announcement (BAA)																								
Demonstration Testing Contract Award																								
Hardware Preparation and Test Planning																								
Guided Flight Test Series																								
Conduct Test Analysis and Document Results																								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603795N / Land Attack Tech	Project (Number/Name) 9999 / Congressional Adds		
Schedule Details				
Events by Sub Project		Start	End	
Proj 9999		Quarter	Year	Quarter
Broad Agency Announcement (BAA)		4	2017	1
Demonstration Testing Contract Award		2	2018	2
Hardware Preparation and Test Planning		2	2018	4
Guided Flight Test Series		4	2018	4
Conduct Test Analysis and Document Results		4	2018	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603851M / Joint Non-Lethal Weapons Testing							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	521.096	26.760	29.873	27.581	-	27.581	28.611	28.234	29.850	30.453	Continuing	Continuing
2319: Non-Lethal Weapons	521.096	26.760	29.873	27.581	-	27.581	28.611	28.234	29.850	30.453	Continuing	Continuing

A. Mission Description and Budget Item Justification

The DoD Non-Lethal Weapons Program was established by the FY96 National Defense Authorization Act. The Office of the Secretary of Defense designated the Commandant of the Marine Corps (CMC) as the DoD NLW Executive Agent (EA). The EA exercises centralized responsibility for joint research and development of non-lethal weapons and technology through the Joint Non-Lethal Weapons Program (JNLWP). The Office of the Under Secretary of Defense for Acquisition, Technology and Logistics serves as the OSD Principal Staff Assistant and oversees, in consultation with the Under Secretary of Defense for Policy, the DoD NLW Executive Agent.

The efforts described in this Program Element (PE) reflect Joint Service research and development (R&D) investment decisions provided by the Joint Non-Lethal Weapons Integrated Product Team, a multi-service flag level corporate board that provides executive oversight and management of the JNLWP for the EA. Research conducted is based on the needs and capabilities of the Services, the Special Operations Command and the Coast Guard, as identified in JROC-approved Joint Non-Lethal Effects Initial Capabilities Documents. This coordinated joint R&D development approach addresses mutual capability gaps and assures the best non-lethal technologies, capabilities and equipment are provided to the operating forces while eliminating duplicative Service investment. Advanced Component Development and Prototypes initiatives provide non-lethal capabilities which directly support the three pillars of the current Quadrennial Defense Review and comprise a fundamental part of DoD's security cooperation efforts to build partner capacity. The resulting capabilities will facilitate a fully integrated non-lethal competency as a complement to lethal firepower, providing force application options for short-of-lethal scenarios.

This PE funds Joint Service research, development, test, and evaluation of non-lethal weapons, devices, munitions and technologies which provide a non-lethal capability to minimize significant injuries as well as undesired damage to property and the environment. Counter-personnel and counter-materiel capability investment areas include directed energy (lasers, millimeter wave and high power microwave), multi-sensory suppression/incapacitation initiatives (acoustics, optical, electro-muscular incapacitation), and other emergent technologies transitioning from coordinated JNLWP Science and Technology PE initiatives. Investments also focus on Joint and allied experimentation, exercise, demonstration and assessment of advanced component and prototype initiatives in order to assist transition of suitable and effective capabilities to both joint and allied operational applications.

The Joint Non-Lethal Weapons Directorate is designated as a R&D organization and was established by the EA to manage the day to day research and development activities of the DoD's JNLWP. Each Service is responsible for their procurement and operating support costs.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603851M / Joint Non-Lethal Weapons Testing			
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Previous President's Budget		27.904	29.873	28.305	-
Current President's Budget		26.760	29.873	27.581	-
Total Adjustments		-1.144	0.000	-0.724	-
• Congressional General Reductions		-	-		
• Congressional Directed Reductions		-	-		
• Congressional Rescissions		-	-		
• Congressional Adds		-	-		
• Congressional Directed Transfers		-	-		
• Reprogrammings		-0.726	0.000		
• SBIR/STTR Transfer		-0.407	0.000		
• Program Adjustments		0.000	0.000	-0.337	-
• Rate/Misc Adjustments		0.000	0.000	-0.387	-
• Congressional General Reductions		-0.011	-	-	-
Adjustments					
Change Summary Explanation					
The FY 2019 funding request was reduced by (\$.337) million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing				Project (Number/Name) 2319 / Non-Lethal Weapons				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2319: Non-Lethal Weapons	521.096	26.760	29.873	27.581	-	27.581	28.611	28.234	29.850	30.453	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			
A. Mission Description and Budget Item Justification													
This project develops non-lethal weapon (NLW) capabilities that minimize fatal or permanent injuries and undesired damage to property and the environment. These capabilities are designed to stun, incapacitate, or hinder movement of individuals, crowds or equipment. The availability of NLW allows commanders less than lethal options, particularly in urban warfare and military operations other than war, i.e. peacekeeping, humanitarian assistance and disaster relief, as well as special operations. The increase of \$1.969M is to support new initiatives in Counter-Materiel Advanced Component Development and Prototypes and Joint and Allied Exercise, Experimentation, Demonstration and Assessment.													
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
<i>Title:</i> Counter-Personnel Advanced Component Development and Prototypes										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
<i>Articles:</i>										13.504	12.033	11.324	0.000
<i>FY 2018 Plans:</i>										-	-	-	-
<ul style="list-style-type: none"> - Continued coordination and requirements development for Service counter-personnel (CP) prototyping initiatives within the JNLWP. This includes SOCOM and USCG. - Continued development and assessment of Service-led CP NL prototype initiatives. - Continued maturation of CP directed energy technologies to increase system efficiencies and reduce system size, weight and cost in preparation for transition to joint acquisition programs of record. - Continued the advanced development of CP emerging technologies to support Service capability gaps and priorities as they support the Combatant Commanders. - Continued technology maturation and risk reduction of competing approaches to inform decisions for Service capability development. - Continued prototype development and assessment of advanced payloads for technological capabilities relevant to emerging counter-personnel capability gaps. - Continued prototype development and demonstration for the most promising technologies employing multisensory stimuli. - Continued program management support for CP efforts. - Continued munitions testing and acquisition documentation of NL capability to deny, move and suppress individuals at long ranges from currently fielded weapons systems. 													
<i>FY 2019 Base Plans:</i>													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing	Project (Number/Name) 2319 / Non-Lethal Weapons					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue all efforts from FY 2018 except those noted as completed.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.							
Title: Counter-Materiel Advanced Component Development and Prototypes	Articles:		9.362	11.336	10.574	0.000	10.574
FY 2018 Plans:							
- Continued coordination and requirements development for Service counter-material (CM) prototyping initiatives within the JNLWP. This includes SOCOM and USCG. - Continued development and assessment of Service-led CM NL prototype initiatives. - Continued maturation of CM directed energy technologies to increase system efficiencies and reduce system size, weight and cost in preparation for transition to joint acquisition programs of record. - Continued the advanced development of Counter-Materiel emerging technologies to support Service capability gaps and priorities as they support the Combatant Commanders. - Continued technology maturation and risk reduction of competing approaches to inform decisions for Service capability development. - Continued prototype development and assessment of advanced payloads for technological capabilities relevant to emerging counter-materiel capability gaps. - Continued program management support for CM efforts. - Continued development of the conceptual design of non-lethal Directed Energy (DE) vessel-stopping capability, including electro-magnetic and engagement modeling, platform feasibility and integration studies, and target characterization and validation. - Initiated production qualification testing of a Service-endorsed pre-emplaced, counter-materiel, counter vehicle stopping capability. - Initiated Critical Design Review for counter material: Radio Frequency vehicle stopper prototype capability							
FY 2019 Base Plans:							
- Continue all efforts from FY 2018 except those noted as completed.							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing	Project (Number/Name) 2319 / Non-Lethal Weapons				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Initiate advanced component development and prototyping support to the U.S. Navy's candidate Maritime Vessel Stopping capability.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.						
Title: Joint and Allied Exercise, Experimentation, Demonstration and Assessment FY 2018 Plans: - Continued modeling and simulation (M&S) of NLWs in warfighter training/gaming models and performance effects data collection/population to demonstrate/analyze NL effects and support optimization of training. - Continued evaluation of NLWs by Service warfighting laboratories and Joint Staff, J7, Joint and Coalition Warfighting for direct user feedback of various non-lethal (NL) technologies and munitions to include policy and strategy and strategic communication. - Continued engagement with NATO on cooperative security efforts, to include providing input for Systems Analysis and Studies (SAS) Panels and NATO assessment of NLW in appropriate allied scenarios and exercises. Specifically, completed the 2017 NATO Non-Lethal Technology Concept Development Game and Tabletop Exercise - Counter Unmanned Aerial Systems (NNTEX-17C). - Continued interaction with Combatant Commander staffs to evaluate emerging NLW capabilities and their utility in theater operations and Defense of the Homeland missions. - Continued effort to assess the utility, effect, and effectiveness of technologies for incapacitating personnel, clearing facilities, stopping vehicles and vessels, and denying enemy access to protected areas. Specifically, completed support to the JIDO Elephant Foot Concept Demonstration by providing prototype vehicle stopping capabilities for integration into this C-VBIED system of systems concept demonstration. - Continued to identify, test, and evaluate newly developed commercial products that may meet Joint service requirements for specific non-lethal capability set common items. - Continued program management support for Joint and Allied Exercise, Experimentation, Demonstration and Assessment efforts. - Continued support of Combatant Commanders (CCMD) by demonstrating and assessing NLW capabilities for multiple priority mission areas, such as port opening operations; Humanitarian Assistance and Disaster Relief	Articles: 3.894	6.504	5.683	0.000	5.683	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018									
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing				Project (Number/Name) 2319 / Non-Lethal Weapons											
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018								
(HA/DR) and Counter-Transnational Organized Crime (CTOC) operations; and harbor and in-transit security operations. - Continued support of two CCMDs by demonstrating and assessing NLW capabilities for vessel interdiction and counter-migration exercises. Specifically, completed support to USAFRICOM in exercise African Lion 2017 and to USEUCOM/USAFRICOM in exercise Phoenix Express 2017. - Initiated leadership of the NATO Special Area Study 133 (SAS-133) panel addressing challenges in fielding NL capabilities.										FY 2019 Base	FY 2019 OCO	FY 2019 Total							
FY 2019 Base Plans: - Continue all efforts from FY 2018 except those noted as completed. - Complete the 2018 NATO Non-Lethal Technology Exercise - CUAS (NNTEX-18C)																			
FY 2019 OCO Plans: N/A																			
FY 2018 to FY 2019 Increase/Decrease Statement: No significant change from FY 2018 to FY 2019.										Accomplishments/Planned Programs Subtotals	26.760	29.873	27.581	0.000	27.581				
C. Other Program Funding Summary (\$ in Millions)																			
Line Item		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost							
• PE 0602651M: <i>Joint Non-Lethal Weapons Applied Research</i>		6.146	6.425	6.349	-	6.349	6.346	6.343	6.468	6.600	Continuing	Continuing							
• PE 0603651M: <i>Joint Non-Lethal Weapons Advanced Technology Development</i>		12.790	13.448	13.313	-	13.313	13.307	13.301	13.564	13.840	Continuing	Continuing							
Remarks																			
D. Acquisition Strategy The JNLW Program strategy is to continue to pursue the fielding of NLW systems through modifying Commercial-Off-The-Shelf (COTS) products for near term capabilities and the development of new technology NLW systems in various stages of acquisition. These are balanced with efforts in state-of-the-art technology investment, experimentation, and modeling and simulation. The acquisition strategy for each weapon system is largely Lead Service dependent. The JNLWP provides																			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603851M / <i>Joint Non-Lethal Weapons Testing</i>	Project (Number/Name) 2319 / <i>Non-Lethal Weapons</i>
RDT&E funding while the Services are responsible for procurement and operations and maintenance funding. For complex development programs, such as directed energy research, JNLWP RDT&E funds will support each Service's RDT&E joint application efforts.		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing				Project (Number/Name) 2319 / Non-Lethal Weapons							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
NLW Product Development	MIPR	ARDEC : Picatinny, NJ	54.732	1.010	Oct 2016	1.129	Oct 2017	3.192	Oct 2018	-		3.192	Continuing	Continuing	Continuing
NLW Product Development	MIPR	SOCOM : McDill AFB, FL	26.065	0.275	Oct 2016	0.283	Oct 2017	0.289	Oct 2018	-		0.289	Continuing	Continuing	Continuing
NLW Product Development	Various	NSWC : Various	42.264	4.688	Oct 2016	4.829	Oct 2017	6.175	Oct 2018	-		6.175	Continuing	Continuing	Continuing
NLW Product Development	MIPR	USAF : Ft. Sam Houston AFB, TX	58.216	0.670	Oct 2016	0.690	Oct 2017	0.525	Oct 2018	-		0.525	Continuing	Continuing	Continuing
NLW Product Development	Various	MCSC : Quantico, VA	32.287	1.432	Oct 2016	1.475	Oct 2017	0.475	Oct 2018	-		0.475	Continuing	Continuing	Continuing
NLW Product Development	Various	Uniformed Services : Various	167.642	9.774	Oct 2016	12.442	Oct 2017	7.718	Oct 2018	-		7.718	Continuing	Continuing	Continuing
Prior Year NLW Product Development	Various	Various : Various	65.401	0.000		0.000		0.000		-		0.000	0.000	65.401	-
Subtotal			446.607	17.849		20.848		18.374		-		18.374	Continuing	Continuing	N/A
Remarks Joint Program funds are distributed amongst the USA, USAF, USN, USMC, SOCOM, and USCG in support of NLW research and development efforts. Each Cost Category Item does not correlate to an individual project/effort. They fund multiple non-lethal projects/efforts that are incrementally funded throughout the fiscal year as each service identifies the project/effort requiring funding. October award dates reflect the start of incremental funding and does not indicate that the full amount will be awarded in October.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
NLW Support Cost	WR	NSWC : Dahlgren, VA	16.774	0.600	Oct 2016	0.618	Oct 2017	0.632	Oct 2018	-		0.632	Continuing	Continuing	Continuing
Subtotal			16.774	0.600		0.618		0.632		-		0.632	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing				Project (Number/Name) 2319 / Non-Lethal Weapons							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
JNLW Management Support	Various	MCSC : Quantico, VA	16.994	8.311	Oct 2016	8.407	Oct 2017	8.575	Oct 2018	-		8.575	Continuing	Continuing	Continuing
Prior Year Management Services	Various	Various : Various	40.721	0.000		0.000		0.000		-		0.000	0.000	40.721	-
Subtotal			57.715	8.311		8.407		8.575		-		8.575	Continuing	Continuing	N/A

Remarks
The JNLW Management Support was previously incorporated into the various cost categories instead of being displayed in the corresponding section of the R-3. The Management Services section of the R-3 now reflects the amounts for civilian salaries and contractor program management. The funding fluctuates across the R-2A categories based on the demand signals of the Services, USSOCOM, and the USCG.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	521.096	26.760		29.873		27.581		-		27.581	Continuing	Continuing	N/A

Remarks
Joint Program funds are distributed amongst the USA, USAF, USN, USMC, SOCOM, and USCG in support of NLW research and development efforts. Each Cost Category Item does not correlate to an individual project/effort. They fund multiple non-lethal projects/efforts that are incrementally funded throughout the fiscal year as each service identifies the project/effort requiring funding. October award dates reflect the start of incremental funding and does not indicate that the full amount will be awarded in October.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603851M / Joint Non-Lethal Weapons
Testing**Project (Number/Name)**
2319 / Non-Lethal Weapons

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
Proj 2319																														
Counter Vehicle: Radio Frequency Vehicle Stopping (RFVS) Technologies: Critical Design Review																														
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Preliminary Design Review																														
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Critical Design Review																														
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Advanced Demonstration Model (ADM) Development and Integration on Alternative Platform																														
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Land-Based Validation and Verification Testing																														
Millimeter Wave (mmW) Radio Frequency (RF): Active Denial Technologies (ADT): Size Weight Power and Cooling Improvements																														
Millimeter Wave (mmW) Radio Frequency (RF): Active Denial Technologies (ADT): ADM Military Utility Assessment (MUA)																														
Counter Personnel: Long Range Suppression Prototype: Ballistics and qualification testing																														

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603851M / Joint Non-Lethal Weapons Testing	Project (Number/Name) 2319 / Non-Lethal Weapons		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 2319</i>				
Counter Vehicle: Radio Frequency Vehicle Stopping (RFVS) Technologies: Critical Design Review		4	2018	2
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Preliminary Design Review		3	2018	1
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Critical Design Review		1	2020	2
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Advanced Demonstration Model (ADM) Development and Integration on Alternative Platform		1	2017	4
Counter Vessel: Vessel Stopping Prototype (VSP) Technology Development: Land-Based Validation and Verification Testing		1	2023	4
Millimeter Wave (mmW) Radio Frequency (RF): Active Denial Technologies (ADT): Size Weight Power and Cooling Improvements		1	2017	4
Millimeter Wave (mmW) Radio Frequency (RF): Active Denial Technologies (ADT): ADM Military Utility Assessment (MUA)		4	2018	1
Counter Personnel: Long Range Suppression Prototype: Ballistics and qualification testing		1	2017	3

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603860N / JT Precision Approach & Ldg Sys								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	1,026.776	102.195	106.391	101.566	-	101.566	52.553	32.960	28.871	31.135	Continuing	Continuing	
2329: JPALS	1,026.776	102.195	106.391	101.566	-	101.566	52.553	32.960	28.871	31.135	Continuing	Continuing	
Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): 238													
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$.743 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.													
A. Mission Description and Budget Item Justification													
The Joint Precision Approach and Landing System (JPALS) is the primary precision approach and landing system for CVN and LHA/D ships to support aircraft without SPN-46 ACLS capability including F-35B, F-35C, MQ-25A and future platforms. JPALS ship systems are required to provide CVN and LHA/D ships a primary precision approach capability during night and instrument flight conditions, including coupled approach capability to a hover transition point for LHA/D ships, and coupled approach to the deck (auto-land) capability aboard CVN ships. JPALS also provides the over-the-air inertial alignment capability for CVN and LHA/D ships to support aircraft platforms without Link-4A capability, including F-35, MQ-25A and future platforms. JPALS Early Operational Capability is required to support initial F-35 operational deployments in FY18. JPALS efforts include addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates.													
JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in high fidelity and realistic operating environments.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0603860N / JT Precision Approach & Ldg Sys			
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Previous President's Budget		104.144	106.391	103.549	-
Current President's Budget		102.195	106.391	101.566	-
Total Adjustments		-1.949	0.000	-1.983	-
• Congressional General Reductions		-	-		
• Congressional Directed Reductions		-	-		
• Congressional Rescissions		-	-		
• Congressional Adds		-	-		
• Congressional Directed Transfers		-	-		
• Reprogrammings		1.761	0.000		
• SBIR/STTR Transfer		-2.288	0.000		
• Program Adjustments		0.000	0.000	-0.743	-
• Rate/Misc Adjustments		0.000	0.000	-1.240	-
• Congressional Directed Reductions		-1.422	-	-	-
Adjustments					
Change Summary Explanation					
Technical: N/A					
Schedule: N/A					
Financial: Added additional funds in FY17 to properly price the JPALS Engineering Development Models.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603860N / JT Precision Approach & Ldg Sys					Project (Number/Name) 2329 / JPALS						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
2329: JPALS	1,026.776	102.195	106.391	101.566	-	101.566	52.553	32.960	28.871	31.135	Continuing	Continuing			
Quantity of RDT&E Articles		2	-	-	-	-	-	-	-	-					
Project MDAP/MAIS Code: 238															
A. Mission Description and Budget Item Justification															
<p>The restructured Joint Precision Approach and Landing System (JPALS) program (post Nunn-McCurdy certification) completed a successful MS B and entry into the Engineering and Manufacturing Development (EMD) phase in June 2016. This budget reflects the Department of Defense certified Component Cost Position of the restructured JPALS program that funds the developmental, testing, and integration activities to implement and field JPALS ship systems that deliver the primary precision approach, landing, on-deck inertial alignment, surveillance, and auto-land capability for current and future low observable manned and unmanned platforms onboard all CVN and LHA/D ships. JPALS Early Operational Capability (EOC) is required to support initial F-35 operational deployments. JPALS provides for development, integration, installation, and test of JPALS on CVN and LHA/D ships in accordance with the Joint Requirements Oversight Council (JROC) March 2016 approved JPALS Capability Development Document (CDD). JPALS Engineering Development Model (EDM) articles have been delivered to support JPALS EMD activities. JPALS EDMs will be installed at shore based test facilities and (temporarily) on CVN and LHA/D ships to support F-35B/C developmental and operational testing and MQ-25A concept refinement, system requirements identification, allocation, surrogate risk reduction, and test. Two JPALS EDMs will be procured and installed to support testing and F-35 shipboard operational deployments that begin in FY18. JPALS will continue to invest in software development in direct support of precision approach and auto-land capabilities for the F-35B/C, MQ-25A, and future air platforms. JPALS effort includes addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates.</p>															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: JPALS Ship Systems and Test Description: JPALS provides for development, integration, installation, and test of Sea-Based JPALS on CVN and LHA/D ships. FY 2018 Plans: Continue JPALS development and test activities in preparation for System Verification Review (SVR) and Production Readiness Review (PRR). Perform JPALS IT-B1 in 2nd quarter and IT-B2/3 in 3rd and 4th quarter. Install cabling, foundations and EDMs on additional LHA/Ds to support F-35B operational deployments and EOC. Support F-35B preparation for and operational deployments. Perform Maintenance Demonstrations (M-											96.800	100.955	95.980	0.000	95.980
											2	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603860N / JT Precision Approach & Ldg Sys		Project (Number/Name) 2329 / JPALS			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Demo) in 4th quarter. Address broadened cyber-security requirements to remain compliant with software cyber-security directives and information assurance mandates.							
FY 2019 Base Plans: Attain MS C in 2nd quarter. Perform System Verification Review (SVR) and Integrated Logistics Assessment (ILA) in 1st quarter and Production Readiness Review (PRR) in 2nd quarter. Award LRIP contract in 3rd quarter. Begin Operational Test (OT) in 3rd quarter. Support F-35 operational deployments.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease of \$4.975M from FY 2018 to FY 2019 is due to the reduction in developmental test support as the program prepares for Milestone C.							
Title: Joint Strike Fighter (JSF) F-35B Marine Corp STOVL and F-35C Navy Carrier Variant Support		Articles:		3.973	3.999		
Description: Provide technical development, shore based, and ship based support for F-35B and F-35C JPALS Integration and Developmental Test (DT) and Operational Test (OT) events. Provide JPALS system certification and documentation to certify shipboard all weather precision approach capability for F-35 operational test and deployments.		-		-	-		
FY 2018 Plans: Support F-35B/C shipboard OT results and analysis. Support preparation for F-35 operational deployments.							
FY 2019 Base Plans: Continue support of F-35 operational deployments including delivery, installation, and ship rider support of the JPALS Early Operational Capability (EOC) units onto ships to support the deployment of the JPALS UDB capable F-35 3F fleet aircraft.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement:							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018					
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603860N / JT Precision Approach & Ldg Sys			Project (Number/Name) 2329 / JPALS							
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Increase of \$0.021M from FY 2018 to FY 2019 is due to inflation.												
Title: MQ-25 Support		Articles:	1.422	1.437	1.566	0.000	1.566					
<p>Description: Provide technical support, lab support, requirements identification, allocation and test activities for MQ-25. Support MQ-25 concept refinement, requirements development, integration specifications, and risk reduction activities for JPALS integration. Support MQ-25 concept refinement and JPALS integration and developmental activities.</p> <p>FY 2018 Plans: Support MQ-25 risk reduction activities, MS B efforts, and continue Engineering and Manufacturing Development phase activities to integrate and test JPALS capabilities.</p> <p>FY 2019 Base Plans: Provide MQ-25 support to including JPALS algorithm integration support to Aircraft OEM, validation and verification activities supporting the aircraft software development, supporting development of the Patuxent River MQ-25 Systems Integration Lab, and preparation for future testing.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$0.129M from FY 2018 to FY 2019 is for increased engineering efforts required for JPALS algorithm integration support to the MQ-25 system.</p>												
Accomplishments/Planned Programs Subtotals					102.195	106.391	101.566	0.000	101.566			
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• OPN/2867: JPALS	0.000	0.000	38.094	-	38.094	62.391	66.226	10.277	10.496	183.207	370.691	
Remarks												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603860N / <i>JT Precision Approach & Ldg Sys</i>	Project (Number/Name) 2329 / JPALS
D. Acquisition Strategy <p>Technology Development phase was conducted jointly by NAVAIRSYSCOM (PMA-213), USAF Electronic Systems Command (Global Air) and multiple industry partners. This effort provided the concept of operations, performance specifications and technology readiness levels necessary to provide the foundation from which to launch the Increment 1 System Development and Demonstration (SDD) phase development. Joint Precision Approach and Landing System (JPALS) reached MS-B on 14 July 2008 and the SDD phase development contract was awarded on 17 July 2008. Tasking consisted of sea-based JPALS, related ship and airborne reference systems, end-to-end software algorithms, necessary ship installation hardware, test equipment, system simulation software, and other RDT&E deliverable products. The SDD contract was decided after full and open competition. JPALS is being developed by the Navy with an open system architecture in order to facilitate the compatible integration of many different aircraft and avionics architectures. JPALS provides for development, integration, installation, and test of Sea-Based JPALS to meet Initial Operation Capability of CVN and LHA/D ships in accordance with the JPALS Capability Development Document (CDD). Additionally, this requirement provides critical enabling technology for Joint Strike Fighter (JSF) F-35B Marine Corps Short Take-Off and Vertical Landing (STOVL) and F-35C Navy Carrier Variant, ship-based MQ-25A, and future Navy and Marine Corps air platforms.</p>		
<p>As a result of the DON Resource and Requirements Review Board approved PALC Roadmap, the JPALS production phase was deferred to include design improvements to provide manned and unmanned aircraft with autoland capabilities. The current Engineering and Manufacturing Development (EMD) contract was modified in FY14 to add detailed requirements and design trade studies to identify specific system design improvements. An extension for pre-Milestone B efforts was awarded in fourth quarter FY15.</p>		
<p>A Development RFP Release Decision Point (DRRDP) Defense Acquisition Board (DAB) was completed and the RFP for JPALS EMD 16 was released on 24 November 2015. A Milestone B (MS B) DAB was completed 02 June 2016. The MS B Acquisition Decision Memorandum (ADM) was approved 27 June 2016, which granted entry into the EMD phase for the restructured JPALS program and officially completed all actions required to exit Nunn-McCurdy. JPALS now has an approved Acquisition Program Baseline (APB) and has been designated an Acquisition Category (ACAT) 1C program. Sole Source contract was awarded to Raytheon in fourth quarter FY16.</p>		
E. Performance Metrics Milestone C scheduled for second quarter FY19.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603860N / JT Precision Approach & Ldg Sys				Project (Number/Name) 2329 / JPALS							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Ship Integration	WR	NAWCAD : Pax River, MD	45.968	9.422	Nov 2016	12.482	Nov 2017	12.296	Nov 2018	-		12.296	Continuing	Continuing	Continuing
Primary Hardware Development - EMD Phase I	C/CPIF	Raytheon : Fullerton, CA	410.181	0.000		0.000		0.000		-		0.000	0.000	410.181	410.181
Primary Hardware Development - New EMD Contract	C/CPIF	Raytheon : Fullerton, CA	6.224	61.966	Nov 2016	60.693	Nov 2017	60.860	Nov 2018	-		60.860	160.728	350.471	350.471
JPALS Modifications for ARC-210	C/CPFF	RCI : Cedar Rapids, IA	4.772	0.332	Nov 2016	0.000		1.849	Nov 2018	-		1.849	1.936	8.889	8.889
Risk Reduction for Auto-land - FFRDC Support	FFRDC	JHU : Laurel, MD	0.493	0.000		0.000		0.000		-		0.000	0.000	0.493	-
Prior Year Prod Dev no longer funded in the FYDP	TBD	Various : Various	249.870	0.000		0.000		0.000		-		0.000	0.000	249.870	-
Subtotal			717.508	71.720		73.175		75.005		-		75.005	Continuing	Continuing	N/A
Remarks															
The Primary Hardware Development contract with Raytheon is a CPIF contract. FY17 funding for the ARC210 RCI contract was the completion of previous EMD work. FY19 commences the next phase of ARC-210 modifications required to support JPALS.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering Support	WR	NAWCAD : Pax River, MD	159.861	15.520	Nov 2016	16.822	Nov 2017	16.375	Nov 2018	-		16.375	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NAWCAD : Pax River, MD	25.301	2.582	Nov 2016	2.659	Nov 2017	2.682	Nov 2018	-		2.682	Continuing	Continuing	Continuing
Prior Year Support Costs non longer funded in FYDP	Various	Various : Various	21.514	0.000		0.000		0.000		-		0.000	0.000	21.514	-
Subtotal			206.676	18.102		19.481		19.057		-		19.057	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603860N / JT Precision Approach & Ldg Sys						Project (Number/Name) 2329 / JPALS						
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation	WR	NAWCAD : Pax River, MD	61.623	8.023	Nov 2016	9.044	Nov 2017	2.772	Nov 2018	-		2.772	Continuing	Continuing	Continuing	
Operational Test & Evaluation	WR	COMOPTEVFOR : Norfolk, VA	3.899	0.409	Nov 2016	0.637	Nov 2017	0.638	Nov 2018	-		0.638	Continuing	Continuing	Continuing	
Subtotal		65.522	8.432			9.681		3.410				3.410	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Management Support	WR	NAWCAD : Pax River, MD	19.781	2.936	Nov 2016	3.035	Nov 2017	3.050	Nov 2018	-		3.050	Continuing	Continuing	Continuing	
PM Support-MSS	C/CPFF	Amelex : Pax River, MD	13.238	0.798	Nov 2016	0.808	Nov 2017	0.829	Nov 2018	-		0.829	1.302	16.975	16.975	
PM Support-MSS	C/CPFF	Avian : Pax River, MD	1.592	0.000		0.000		0.000		-		0.000	0.000	1.592	1.592	
PM Support-MSS	C/CPFF	SAIC : Pax River, MD	2.207	0.139	Nov 2016	0.141	Nov 2017	0.142	Nov 2018	-		0.142	0.182	2.811	2.811	
Travel	WR	NAVAIR : Pax River, MD	0.252	0.068	Nov 2016	0.070	Nov 2017	0.073	Nov 2018	-		0.073	Continuing	Continuing	Continuing	
Subtotal		37.070	3.941			4.054		4.094				4.094	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			1,026.776	102.195			106.391		101.566		-		101.566	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

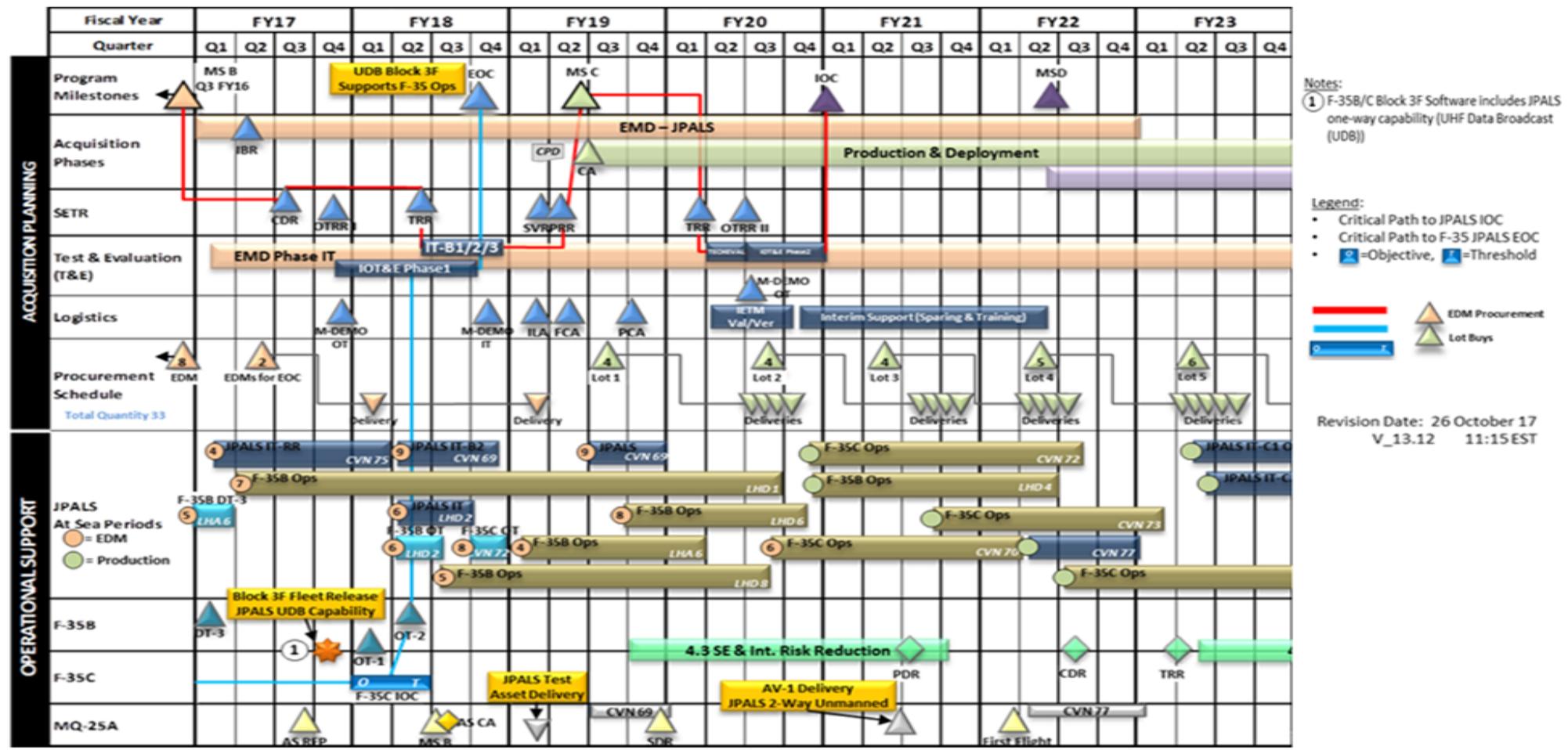
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0603860N / JT Precision Approach &
Ldg Sys

Project (Number/Name)
2329 / JPALS



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603860N / JT Precision Approach & Ldg Sys	Project (Number/Name) 2329 / JPALS		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
JPALS				
Acquisition Milestones: MS C		2	2019	2
Acquisition Milestones: Early Operating Capability (EOC)		4	2018	4
Systems Development: Engineering and Manufacturing Development		1	2017	4
Systems Development: Reviews: Critical Design Review (CDR)		3	2017	3
Systems Development: Reviews: System Verification Review (SVR)		1	2019	1
Systems Development: Reviews: Integrated Logistics Assessment (ILA)		1	2019	1
Systems Development: Contract Awards: LRIP Contract Award		3	2019	3
Test & Evaluation: Operational Test and Evaluation (IOT&E) Phase 1		2	2018	1
Test & Evaluation: JPALS Operational Test Readiness Review (OTRR)		2	2018	2
Production Milestones: Production Readiness Review (PRR)		2	2019	2

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0603925N / Directed Energy and Electric Weapon System								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	100.205	34.039	107.310	223.344	-	223.344	107.886	46.783	38.561	31.911	Continuing	Continuing	
3370: Railgun	77.679	21.737	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	99.416	
3402: Surface Navy Laser Weapon System (SNLWS)	0.000	0.000	63.281	190.237	-	190.237	89.632	44.751	36.558	29.768	Continuing	Continuing	
9823: Lasers for Navy applicat	22.526	12.302	44.029	33.107	-	33.107	18.254	2.032	2.003	2.143	Continuing	Continuing	

A. Mission Description and Budget Item Justification

This program element will transition Directed Energy and Electric Weapon Systems (DE&EWS) technology from Science and Technology (S&T) research to the Technology Maturation and Risk Reduction phase, ultimately leading to acquisition initiation for the Surface/Subsurface Navy.

DE&EWS consist of multiple breakthrough technologies including: laser weapons that provide for speed-of-light engagements at tactically significant ranges resulting in savings realized by minimizing the use of defensive missiles and projectiles; electromagnetic launch of projectiles that will significantly increase firing ranges imposing greater cost to adversaries of ballistic and air defense missile engagements; enhance the land attack mission; and fielding of high power radio frequency systems for non-kinetic electronic attack and active denial technology, allowing for non-lethal determination of threat intent beyond small arms fire ranges.

Development of DE&EWS includes: Weapons Grade High Energy Lasers, Electromagnetic Railgun (EMRG) Weapon Systems, High Power Radio Frequency Weapon/Sensor Systems, and other systems/capabilities.

Project 3370 - Railgun: EMRG provides ship-based program/technical development to produce a standard railgun/mount for use onboard Navy warships. Railgun provides increased capability for the following mission sets: Naval Surface Fire Support (NSFS), Integrated Air and Missile Defense (IAMD), Fast Attack Craft and Fast Inshore Attack Craft (FAC/FIAC), and future potential for Anti-Surface Warfare (ASuW). EMRG uses electromagnetic energy, vice traditional chemical propellant (i.e. gun powder), to launch projectiles providing: greatly increased range (110+nm vice 13nm for current 5" chemical propellant [gunpowder] guns); increased ammunition storage capacity; increased ship safety; increased layered point defense; and decreased costs when compared to current weapons. The net effect is an increased capacity against multiple simultaneous threats at a lower operational cost to offset a potential adversary's asymmetric missile strategy. The EMRG will launch the Hyper Velocity Projectile (HVP).

Project 3402 - Surface Navy Laser Weapon System (SNLWS): SNLWS funding was provided for the expedited development and fielding of the SNLWS system to Naval Forces. SNLWS includes the development of advanced prototype laser weapon systems in the 60 kW or higher class. SNLWS leverages mature technology to deliver a proven laser weapon capability to the Fleet. SNLWS development leverages the Office of Naval Research (ONR) efforts on the Solid State Laser (SSL) Quick Reaction Capability (QRC) and Solid State Laser (SSL) Technology Maturation (TM) efforts. SNLWS provides a capability to address existing Anti-Surface Warfare, Integrated Air and Missile Defense and Counter-Intelligence, Surveillance and Reconnaissance (C-ISR) Gaps with the ability to dazzle and destroy Unmanned Aerial Systems (UASs) and Fast Inshore Attack Craft (FIAC).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018																																																																														
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System																																																																														
The funding in PB19 was increased in order to procure two (2) additional SNLWS units for two DDG 51 class ship installations and was based on a certified NAVSEA cost estimate that more accurately predicts actual program costs. This increase provides the requisite level of funding for the system engineering and combat system integration, threat analysis, ship installation/integration/planning/drawings/scheduling, test planning, and maintenance/sustainment engineering/planning for the first two SNLWS units. FY18 efforts are focused on program and system requirements definition, contract proposal development and evaluation, and contract award which will allow procurement of long lead material to maintain the schedule for delivery of the initial SNLWS units.																																																																															
Project 9823 - Lasers for Navy Applications: Low Power Module (LPM) development will provide near-term, directed energy, shipboard Counter-Intelligence, Surveillance, and Reconnaissance (C-ISR) capabilities to dazzle Unmanned Aerial Systems (UASs) and other platforms that will address urgent operational needs of the Fleet. FY18 is the first year of funding that will support the design, development and procurement of eight standalone units over the FYDP, for deployment on DDG 51 surface combatants. The program will support the non-recurring engineering, development, procurement of long lead material, assembly and checkout, system certification, and platform integration/installation for these eight standalone units.																																																																															
B. Program Change Summary (\$ in Millions) <table> <thead> <tr> <th></th> <th>FY 2017</th> <th>FY 2018</th> <th>FY 2019 Base</th> <th>FY 2019 OCO</th> <th>FY 2019 Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>32.700</td> <td>107.310</td> <td>117.907</td> <td>-</td> <td>117.907</td> </tr> <tr> <td>Current President's Budget</td> <td>34.039</td> <td>107.310</td> <td>223.344</td> <td>-</td> <td>223.344</td> </tr> <tr> <td>Total Adjustments</td> <td>1.339</td> <td>0.000</td> <td>105.437</td> <td>-</td> <td>105.437</td> </tr> <tr> <td> • Congressional General Reductions</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Directed Reductions</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Rescissions</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Adds</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Congressional Directed Transfers</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Reprogrammings</td> <td>1.800</td> <td>0.000</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • SBIR/STTR Transfer</td> <td>-0.461</td> <td>0.000</td> <td></td> <td></td> <td></td> </tr> <tr> <td> • Program Adjustments</td> <td>0.000</td> <td>0.000</td> <td>109.000</td> <td>-</td> <td>109.000</td> </tr> <tr> <td> • Rate/Misc Adjustments</td> <td>0.000</td> <td>0.000</td> <td>-3.563</td> <td>-</td> <td>-3.563</td> </tr> </tbody> </table>			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Previous President's Budget	32.700	107.310	117.907	-	117.907	Current President's Budget	34.039	107.310	223.344	-	223.344	Total Adjustments	1.339	0.000	105.437	-	105.437	• Congressional General Reductions	-	-				• Congressional Directed Reductions	-	-				• Congressional Rescissions	-	-				• Congressional Adds	-	-				• Congressional Directed Transfers	-	-				• Reprogrammings	1.800	0.000				• SBIR/STTR Transfer	-0.461	0.000				• Program Adjustments	0.000	0.000	109.000	-	109.000	• Rate/Misc Adjustments	0.000	0.000	-3.563	-	-3.563
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total																																																																										
Previous President's Budget	32.700	107.310	117.907	-	117.907																																																																										
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• Rate/Misc Adjustments	0.000	0.000	-3.563	-	-3.563																																																																										
Change Summary Explanation The FY19 funding increase in the amount of +\$105.437 million reflects the following: +\$109 million Project 3402 - PB19 funding was based on a certified NAVSEA cost estimate that more accurately predicts actual program costs and procures two additional shipboard prototype systems. This increase fully funds SNLWS to the February 2017 cost estimate. -\$3.563 million miscellaneous rate adjustments.																																																																															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0603925N / Directed Energy and Electric Weapon System				3370 / Railgun			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3370: Railgun	77.679	21.737	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	99.416
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

EMRG provides ship-based program/technical development to produce a standard railgun/mount for use onboard Navy warships. Railgun provides increased capability for the following mission sets: Naval Surface Fire Support (NSFS), Integrated Air and Missile Defense (IAMD), Fast Attack Craft and Fast Inshore Attack Craft (FAC/FIAC), and future potential for Anti-Surface Warfare (ASuW). EMRG uses electromagnetic energy, vice traditional chemical propellant (i.e. gun powder), to launch projectiles providing: greatly increased range (110+nm vice 13nm for current 5" chemical propellant [gunpowder] guns); increased ammunition storage capacity; increased ship safety; increased layered point defense; and decreased costs when compared to current weapons. The net effect is an increased capacity against multiple simultaneous threats at a lower operational cost to offset a potential adversary's asymmetric missile strategy. The EMRG will launch the Hyper Velocity Projectile (HVP), currently in development as a Future Naval Capability (FNC).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
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Title: Railgun

Articles:

21.737	0.000	0.000	0.000	0.000
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-	-	-	-	-
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FY 2018 Plans:

N/A

FY 2019 Base Plans:

N/A

FY 2019 OCO Plans:

N/A

Accomplishments/Planned Programs Subtotals

21.737	0.000	0.000	0.000	0.000
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-	-	-	-	-
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C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / <i>Directed Energy and Electric Weapon System</i>	Project (Number/Name) 3370 / <i>Railgun</i>
E. Performance Metrics		
N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 3370 / Railgun							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware - Test Stand/Pulsed Power/Power & Energy/Platform Requirements/Development	MIPR	BAE, Merrill, Meggitt, Syntek, IAP, GA, ARDEC, Ray : Picatinny Arsenal, NJ	13.974	7.524	Jul 2017	0.000		0.000		-		0.000	0.000	21.498	-
Hardware - Test Stand/Platform Requirements/Development	C/CPFF	GRYPHON, GSA : Washington,D.C., Dahlgren, VA	2.578	0.000		0.000		0.000		-		0.000	0.000	2.578	-
Hardware - Test Stand/Platform Requirements Development	WR	NSWC DD; NSWC Corona : Dahlgren, VA, Corona, CA	7.309	0.000		0.000		0.000		-		0.000	0.000	7.309	-
Hardware - Power Conversion	C/CPFF	NAVSEA PMS 320 Contract,ROLLS ROYCE : Washington, D.C.	0.085	0.000		0.000		0.000		-		0.000	0.000	0.085	-
Hardware - Power Conversion	WR	NAVSSESS : Philadelphia, PA	1.492	1.000	Jul 2017	0.000		0.000		-		0.000	0.000	2.492	-
Hardware - Pulsed Power Development	WR	NSWC DD; Dahlgren, VA	2.562	3.626	Jul 2017	0.000		0.000		-		0.000	0.000	6.188	-
Hardware - Pulsed Power Development	C/CPFF	NAVSEA, PMS 320, BAE, RAYTHEON : Washington, D.C.	8.658	0.000		0.000		0.000		-		0.000	0.000	8.658	-
Hardware - Battery and Charging Supply Development/Certification	C/CPFF	NAVSEA PMS 320 Various : Washington, D.C.	4.406	1.950	Jul 2017	0.000		0.000		-		0.000	0.000	6.356	-
Hardware - Battery & Charging Supply Dev/Cert	WR	NAVSSES : Philadelphia, PA	2.100	0.000		0.000		0.000		-		0.000	0.000	2.100	-
Hardware - Projectile Development	C/CPFF	Contractor via AFRL, BAE : Rome, NY, Minneapolis, MN	0.188	0.000		0.000		0.000		-		0.000	0.000	0.188	-
Hardware - HVP EM Compatibility	WR	NSWC/DD : Dahlgren, VA	5.540	1.155	Jul 2017	0.000		0.000		-		0.000	0.000	6.695	-
Hardware - Projectile Development	WR	NSWC/IH : Indian Head, MD	0.386	0.000		0.000		0.000		-		0.000	0.000	0.386	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 3370 / Railgun							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Weapon System	WR	NSWC/DD : Dahlgren, VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Software Weapon System	C/CPFF	MDA : Redstone Arsenal, AL	0.700	0.000		0.000		0.000		-		0.000	0.000	0.700	-
Software Fire Control System	WR	NSWC/DD, NSWC Corona : Dahlgren, VA, Corona, CA	3.610	0.000		0.000		0.000		-		0.000	0.000	3.610	-
Hardware - Pulsed Power Development	C/CPFF	DTI : NAVSEA 05	0.000	0.200	Jul 2017	0.000		0.000		-		0.000	0.000	0.200	-
Advanced Pulsed Power Swap-C	WR	VAR : VAR	0.000	1.004	Jul 2017	0.000		0.000		-		0.000	0.000	1.004	-
Subsystem Technology Assessment	WR	NSWC DD : Dahlgren, VA	0.000	1.125	Jul 2017	0.000		0.000		-		0.000	0.000	1.125	-
Tech Maturation of Core Components	WR	NSWC DD : Dahlgren, VA	0.000	0.585	Jul 2017	0.000		0.000		-		0.000	0.000	0.585	-
Subtotal			53.588	18.169		0.000		0.000		-		0.000	0.000	71.757	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering/Management	WR	NSWC/DD : Dahlgren, VA	6.762	0.000		0.000		0.000		-		0.000	0.000	6.762	-
System Engineering/Management	C/CPFF	PSU EOC, BIW, AGS, DTI : Washington, D.C.	1.436	0.000		0.000		0.000		-		0.000	0.000	1.436	-
System Engineering/Management	WR	NSWC, IH : Indian Head, MD	0.052	0.090	Jul 2017	0.000		0.000		-		0.000	0.000	0.142	-
Hypervelocity Projectile Sys Engr/Mgmt	C/CPFF	JHU/APL : Baltimore, MD	0.780	0.000		0.000		0.000		-		0.000	0.000	0.780	-
Hypervelocity Projectile Sys Engr/Mgmt	WR	NSWC CD : Carderock, MD	0.000	0.370	Jul 2017	0.000		0.000		-		0.000	0.000	0.370	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 3370 / Railgun							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering/ Management	C/CPFF	Gryphon Technologies : Washington, DC	0.000	0.159	Jul 2017	0.000		0.000		-		0.000	0.000	0.159	-
Systems Engineering/ Management	MIPR	COTF/MCOTEA : Norfolk, VA	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
Systems Engineering/ Management	C/CPFF	Lockheed Martin : Various	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
Subtotal			9.330	0.619		0.000		0.000		-		0.000	0.000	9.949	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Airframe Analysis	WR	NSWC DD, Eglin AFB, Robins AFB : Dahlgren, VA, Robins AFB GA, Eglin AFB	1.540	0.000		0.000		0.000		-		0.000	0.000	1.540	-
WSMR T&E/GFE	WR	NSWC DD : Dahlgren, VA	1.300	0.545	Jul 2017	0.000		0.000		-		0.000	0.000	1.845	-
Landbased/Seabased Plan/Install/Conduct	WR	NSWC/DD : Dahlgren, VA, Corona, CA	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
Power and Energy Test Bed Development	WR	NAVSSESS; AFRL; Eglin : Philadelphia, PA; Washington, D.C.	2.785	0.345	Jul 2017	0.000		0.000		-		0.000	0.000	3.130	-
Landbased Test Support	WR	NAVFAC : Jacksonville, FL	0.104	0.000	Jul 2017	0.000		0.000		-		0.000	0.000	0.104	-
Landbased Test Support	WR	WSMR : Port Hueneme CA	1.300	0.060	Jul 2017	0.000		0.000		-		0.000	0.000	1.360	-
Hypervelocity Projectile	WR	WSMR : Port Hueneme CA	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 3370 / Railgun								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
		Subtotal	8.229	0.950		0.000		0.000		-		0.000	0.000	9.179	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Project Engineering/ Management	MIPR	ARDEC : Picatinny Arsenal, NJ	2.175	0.000		0.000		0.000		-		0.000	0.000	2.175	-	
Project Engineering/ Management	WR	NSWC Dahlgren : Dahlgren, VA	2.900	1.200	Jul 2017	0.000		0.000		-		0.000	0.000	4.100	-	
Project Engineering/ Management	WR	NPS : Monterey, CA	0.128	0.300	Jul 2017	0.000		0.000		-		0.000	0.000	0.428	-	
Project Engineering/ Management	C/CPFF	ALION/CSC : Washington, D.C.	0.554	0.204	Jul 2017	0.000		0.000		-		0.000	0.000	0.758	-	
Program Management/ Support	C/CPFF	CACI/ALION : Washington, D.C.	0.775	0.136	Jul 2017	0.000		0.000		-		0.000	0.000	0.911	-	
Program Management/ Support	C/CPFF	TMB/Kratos : Arlington, VA	0.000	0.159	Jul 2017	0.000		0.000		-		0.000	0.000	0.159	-	
		Subtotal	6.532	1.999		0.000		0.000		-		0.000	0.000	8.531	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				77.679	21.737		0.000		0.000		-		0.000	0.000	99.416	N/A

Remarks

- Award Date reflects month of the most recent contract modification or incremental payment.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0603925N / Directed Energy and
Electric Weapon System**Project (Number/Name)**

3370 / Railgun

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Proj 3370

Preliminary Design Review (PDR): Power Conversion



Critical Design Review (CDR): Power Conversion



Prototype Component Procurement: Test Stand



Prototype Component Procurement: Power Conversion



Component Test Planning & Conduct: Test Stand



Component Test Planning & Conduct: Power Conversion



System Testing: System Testing



System Analysis: System Analysis



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / <i>Directed Energy and Electric Weapon System</i>	Project (Number/Name) 3370 / <i>Railgun</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3370				
Preliminary Design Review (PDR): Power Conversion	1	2017	3	2017
Critical Design Review (CDR): Power Conversion	3	2017	3	2017
Prototype Component Procurement: Test Stand	2	2017	1	2018
Prototype Component Procurement: Power Conversion	1	2017	1	2018
Component Test Planning & Conduct: Test Stand	4	2017	1	2018
Component Test Planning & Conduct: Power Conversion	4	2017	1	2018
System Testing: System Testing	4	2017	1	2018
System Analysis: System Analysis	4	2017	1	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0603925N / Directed Energy and Electric Weapon System				3402 / Surface Navy Laser Weapon System (SNLWS)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3402: Surface Navy Laser Weapon System (SNLWS)	0.000	0.000	63.281	190.237	-	190.237	89.632	44.751	36.558	29.768	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Project 3402 - Surface Navy Laser Weapon System (SNLWS): SNLWS funding was provided for the expedited development and fielding of the SNLWS system to Naval Forces. SNLWS includes the development of advanced prototype laser weapon systems in the 60 kW or higher class. SNLWS leverages mature technology to deliver a proven laser weapon capability to the Fleet. SNLWS development leverages the Office of Naval Research (ONR) efforts on the Solid State Laser (SSL) Quick Reaction Capability (QRC) and Solid State Laser (SSL) Technology Maturation (TM) efforts. SNLWS provides a capability to address existing Anti-Surface Warfare, Integrated Air and Missile Defense and Counter-Intelligence, Surveillance and Reconnaissance (C-ISR) Gaps with the ability to dazzle and destroy Unmanned Aerial Systems (UASs) and Fast Inshore Attack Craft (FIAC).

The funding in PB19 was increased in order to procure two (2) additional SNLWS units for two DDG 51 class ship installations and was based on a certified NAVSEA cost estimate that more accurately predicts actual program costs. This increase provides the requisite level of funding for the system engineering and combat system integration, threat analysis, ship installation/integration/planning/drawings/scheduling, test planning, and maintenance/sustainment engineering/planning for the first two SNLWS units. FY18 efforts are focused on program and system requirements definition, contract proposal development and evaluation, and contract award which will allow procurement of long lead material to maintain the schedule for delivery of the initial SNLWS units.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: SNLWS Development	0.000	36.104	160.783	0.000	160.783
Articles:	-	-	-	-	-

FY 2018 Plans:

- Initiate SNLWS development. This includes system hardware and software design and documentation development; non-recurring system/sub-system/component engineering and management; and component/sub-system procurement, assembly, and testing.
- Conduct systems engineering efforts for laser, mount, beam transport, power and cooling, and systems/ship integration. Perform functional decomposition of the system level documentation into sub-system level requirements for the laser, weapon mount, beams control architecture and transport system, power and cooling sub system and ship interface requirements, and conduct review
- Conduct System Requirements Review of system design and interfaces
- Conduct System Functional Review of system/subsystem specifications and interfaces

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0603925N / Directed Energy and Electric Weapon System	3402 / Surface Navy Laser Weapon System (SNLWS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none">- Initiate development of Preliminary Design Data/Package- Conduct SNLWS Technical Interchange Meetings (TIMs) with PEO IWS and designated field activities.- Provide programmatic and engineering support to SNLWS Integrated Product Teams (IPTs) and Working Groups (WGs).- Initiate procurement of the following long lead material for two systems: Lasers/Mirrors which includes Lasers, Fiber Amplifiers, Tracking Illuminator, Mirrors (primary & secondary); and Beam Director/Optics which includes Beam Director, Exit Windows, Optics/Optical Bench.- Develop and deliver required contract deliverables/documentation.						
FY 2019 Base Plans:						
<ul style="list-style-type: none">- Continue SNLWS development. This includes creating an A-Specification which meets the requirements in the System Scope Document (SSD); conducting systems engineering efforts for laser, mount, beam transport, power and cooling, and systems/ship integration; initiating system design that meets the A-Specification and Government furnished external (Mechanical, Electrical, and Logical) interface requirements and ship integration study requirements; initiating functional decomposition of the system level documentation into sub-system level requirements for the laser, weapon mount, beams control architecture and transport system, power and cooling sub system and ship interface requirements.- Develop Interface Functional Descriptions (IFDs) for the combat system baseline.- Develop system level control and combat system interface software.- Continue development of Preliminary Design/Technical Data Package consisting of: design documentation; non-recurring system/sub-system/component engineering and management; and component/sub-system procurement, assembly, and testing.- Conduct SNLWS Technical Interchange Meetings (TIMs) with PEO IWS and designated field activities.- Provide programmatic and engineering support to SNLWS Integrated Product Teams (IPTs) and Working Groups (WGs).- Conduct Preliminary Design Review to provide a technical assessment of the system architecture and preliminary system design and establish the allocated baseline.- Continue procurement of materials as for the first two systems to include: Mount, Computer Systems, Cables/Connectors, Cameras/Illuminators, Laser Structure/Foundation, Power/Cooling Mod Kits, and Platform Mod Kits.- Receive and integrate Laser Weapon Control System (LWCS) and Laser Fire Control System (LFCS) GFE into final system design.- Conduct Critical Design Review to assess the system detailed design prior to fabrication of hardware and coding of software.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System	Project (Number/Name) 3402 / Surface Navy Laser Weapon System (SNLWS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none"> - Conduct Production Readiness Review to determine if the design is ready for production and if the contractor has accomplished adequate production planning. - Prepare for conduct of system Test Readiness Review to determine if SNLWS is ready to proceed into formal testing by verifying test procedures are complete and are in compliance with approved test plans. - Continue fabrication of two units, each consisting of a High Energy Laser Weapon System combined with a C-ISR capability for countering UAS-mounted sensors. - Initiate procurement of long lead material for two additional units: Lasers/Mirrors which includes Lasers, Fiber Amplifiers, Tracking Illuminator, Mirrors (primary & secondary); and Beam Director/Optics which includes Beam Director, Exit Windows, Optics/Optical Bench. - Develop and deliver required contract deliverables/documentation. 						
FY 2019 OCO Plans: N/A.						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increased in FY19 to procure two (2) additional SNLWS units for two DDG 51 class ship installations based on a certified NAVSEA cost estimate that more accurately predicts actual program costs. The FY19 increase provides the requisite level of funding for the system engineering and combat system integration, threat analysis, ship installation/integration planning/drawings/scheduling, test planning, and maintenance/sustainment engineering/planning for the first two SNLWS units as well as the additional two SNLWS units in accordance with the adjudicated/approved NAVSEA cost estimates. FY18 efforts are focused on program and system requirements definition, contract proposal development and evaluation, and a 3rd quarter contract award which will allow procurement of long lead material to maintain the schedule for delivery of the initial SNLWS units.						
Title: SNLWS Government and Support Engineering Services Articles:		0.000	27.177	29.454	0.000	29.454
FY 2018 Plans: <ul style="list-style-type: none"> - Conduct reviews of Requests For Proposals received from industry and conduct Source Selection. - Develop and award SNLWS Increment 1 contract. - Support System Requirements Review conducted by the prime contractor of system/subsystem specifications and interfaces. - Support System Functional Review conducted by the prime contractor of system design and interfaces. - Support Preliminary Design Review (PDR) engineering and analysis efforts leading up to conduct of the formal PDR. 						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)		
1319 / 4	PE 0603925N / Directed Energy and Electric Weapon System	3402 / Surface Navy Laser Weapon System (SNLWS)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
<ul style="list-style-type: none">- Initiate AEGIS Combat System software development and integration planning, trade studies and engineering.- Initiate DDG 51 Flight IIA Ship Integration & Installation requirements, trade studies and engineering.- Provide engineering support of the contractor development of Interface Functional Descriptions (IFDs) for the appropriate combat system baseline.- Initiate test planning, test facility scheduling, provision of test assets, and test procedure scoping/development to ensure traceability to system requirements to support requisite system testing upon receipt of system from the contractor.- Initiate hardware/software development/build of Laser Weapon Control System (LWCS) and Laser Fire Control System (LFCS) to be provided as government furnished equipment (GFE).- Review, comment, approve all contractor developed and delivered contract cost, schedule, and performance related documentation.				FY 2019 OCO
<p>FY 2019 Base Plans:</p> <ul style="list-style-type: none">- Support all management/technical efforts required in support of Preliminary Design Review (PDR) efforts leading up to and conducting the formal PDR.- Support all management/technical efforts required in support of Critical Design Review (CDR) efforts leading up to and conducting the formal CDR.- Continue review of all contractor provided engineering, design, production readiness, and test documentation.- Conduct Technical Interchange Meetings (TIMs) with contractor and government personnel.- Provide programmatic and engineering support to government-led Integrated Product Teams (IPTs) and Working Groups (WGs).- Conduct Production Readiness Review for contractor developed components/subsystems/system.- Complete hardware/software build of LWCS and provide to contractor as GFE.- Complete build of the LFCS and provide to contractor as GFE.- Exercise contract option for provision of two additional units.- Continue AEGIS Combat System software engineering, development, and integration; conduct Levels 1-5 integration and testing.- Continue DDG 51 Flight IIA Ship Integration and Installation engineering ship data package development, review, and approval.- Finalize test plans, procedures, and schedules that ensure traceability to system requirements as part of required contractor testing.- Support efforts leading up to the Test Readiness Review for contractor developed components/subsystems/systems.			FY 2019 Total	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System	Project (Number/Name) 3402 / Surface Navy Laser Weapon System (SNLWS)			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018
<ul style="list-style-type: none"> - Review/comment/approve deliverables provided by the contractor. - Develop and deliver programmatic and technical documentation to support the Rapid Prototyping, Experimentation, and Demonstration (RPED) initiative and all requisite cost, schedule, and performance reporting requirements. FY 2019 OCO Plans: N/A.					FY 2019 Base	FY 2019 OCO
FY 2018 to FY 2019 Increase/Decrease Statement: Increased funding in FY19 funds the government to provide oversight of the prime contractor, validate the contractor's design to meet technical and performance requirements, ensure production readiness, and to incrementally integrate the laser capability into the AEGIS Combat System to include threat analysis, modeling and simulation, and planning of test assets and target assets for verification of system capabilities by the contractor.					FY 2019 Total	
Accomplishments/Planned Programs Subtotals					0.000	63.281
190.237					0.000	190.237
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
The SNLWS is an initiative that provides for industry-developed and government integrated capability to the Fleet in as short a timeframe as possible. Competition is utilized for system development and prototype production efforts. The acquisition strategy permits accelerated fielding of laser weapon systems in the Fleet.						
E. Performance Metrics						
<ul style="list-style-type: none"> - Conduct SNLWS Source Selection. - Award SNLWS contract. - Conduct System Requirements Review. - Conduct System Functional Review. - Develop/deliver Laser Weapon Control System (LWCS) as GFE. - Conduct Preliminary Design Review. - Conduct Final Design Review. - Develop/deliver Laser Fire Control System (LFCS) as GFE. - Conduct Production Readiness Review. 						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / <i>Directed Energy and Electric Weapon System</i>	Project (Number/Name) 3402 / <i>Surface Navy Laser Weapon System (SNLWS)</i>
<ul style="list-style-type: none">- Conduct T&E review for Contractor Test.- Conduct Contractor Test.- Deliver Test Units.- Install, Develop, Test & Operate delivered system.- Sustain delivered systems.- Initiate Combat System Integration & DDG 51 Flight IIA Integration/Installation Engineering.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 3402 / Surface Navy Laser Weapon System (SNLWS)								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SNLWS Development	C/CPIF	Contractor TBD : TBD	0.000	0.000		36.104	Apr 2018	160.783	Apr 2019	-		160.783	Continuing	Continuing	Continuing	
			Subtotal	0.000	0.000		36.104		160.783		-		160.783	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SNLWS Systems Engineering, Program Management, GFE/GFI	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		15.561	Nov 2017	13.586	Nov 2018	-		13.586	Continuing	Continuing	Continuing	
SNLWS Ship Installation Documentation	C/CPAF	BIW : Bath, ME	0.000	0.000		1.171	Feb 2018	2.311	Feb 2019	-		2.311	Continuing	Continuing	Continuing	
SNLWS Combat System Integration	C/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.000		2.813	Oct 2017	2.870	Feb 2019	-		2.870	Continuing	Continuing	Continuing	
SNLWS Systems Engineering	WR	NSWC Crane : Crane, IN	0.000	0.000		0.597	Nov 2017	0.984	Nov 2018	-		0.984	Continuing	Continuing	Continuing	
SNLWS Systems Engineering	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.733	Nov 2017	1.038	Nov 2018	-		1.038	Continuing	Continuing	Continuing	
SNLWS Systems Engineering	WR	SSC PAC : San Diego, CA	0.000	0.000		0.146	Nov 2017	0.150	Nov 2018	-		0.150	Continuing	Continuing	Continuing	
SNLWS Systems Engineering	WR	NPS : Monterey, CA	0.000	0.000		0.200	Nov 2017	0.210	Nov 2018	-		0.210	Continuing	Continuing	Continuing	
SNLWS Systems Engineering	MIPR	MIT LL : Lexington, MA	0.000	0.000		0.150	Jan 2018	0.160	Dec 2018	-		0.160	Continuing	Continuing	Continuing	
SNLWS Systems Engineering	C/CPFF	PSU EOC : Freeport, PA	0.000	0.000		0.500	Feb 2018	1.421	Dec 2018	-		1.421	Continuing	Continuing	Continuing	
SNLWS Technical Director	WR	NSWC Crane : Crane, IN	0.000	0.000		0.280	Nov 2017	0.300	Nov 2018	-		0.300	Continuing	Continuing	Continuing	
SNLWS Product Support	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.182	Nov 2017	0.600	Nov 2018	-		0.600	Continuing	Continuing	Continuing	
			Subtotal	0.000	0.000		22.333		23.630		-		23.630	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 3402 / Surface Navy Laser Weapon System (SNLWS)								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SNLWS Test & Evaluation	WR	SSC PAC : San Diego, CA	0.000	0.000		0.354	Nov 2017	0.424	Nov 2018	-		0.424	Continuing	Continuing	Continuing	
SNLWS Test & Evaluation	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.522	Nov 2017	0.506	Nov 2018	-		0.506	Continuing	Continuing	Continuing	
SNLWS Test & Evaluation	WR	NSWC Crane : Crane, IN	0.000	0.000		0.250	Nov 2017	0.415	Nov 2018	-		0.415	Continuing	Continuing	Continuing	
SNLWS Test & Evaluation	WR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		1.329	Nov 2017	1.381	Nov 2018	-		1.381	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		2.455		2.726		-		2.726	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SNLWS Program Management/Engineering Support	C/CPFF	GRYPHON Technologies : Washington, D.C.	0.000	0.000		0.927	Feb 2018	1.378	Dec 2018	-		1.378	Continuing	Continuing	Continuing	
SNLWS Program Management/Engineering Support	C/CPIF	SPA : Washington, D.C.	0.000	0.000		0.950	Dec 2017	1.020	Dec 2018	-		1.020	Continuing	Continuing	Continuing	
SNLWS Travel	Various	NAVSEA : Washington, D.C.	0.000	0.000		0.150	Feb 2018	0.200	Feb 2019	-		0.200	Continuing	Continuing	Continuing	
SNLWS Program Management	C/CPFF	TMB : Washington, D.C.	0.000	0.000		0.162	Dec 2017	0.300	Dec 2018	-		0.300	Continuing	Continuing	Continuing	
SNLWS Program Management	C/CPFF	Strategic Insight : Washington, D.C.	0.000	0.000		0.200	Feb 2018	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		2.389		3.098		-		3.098	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		63.281		190.237		-		190.237	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy							Date: February 2018					
Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)						
1319 / 4			PE 0603925N / Directed Energy and Electric Weapon System			3402 / Surface Navy Laser Weapon System (SNLWS)						
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Remarks												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

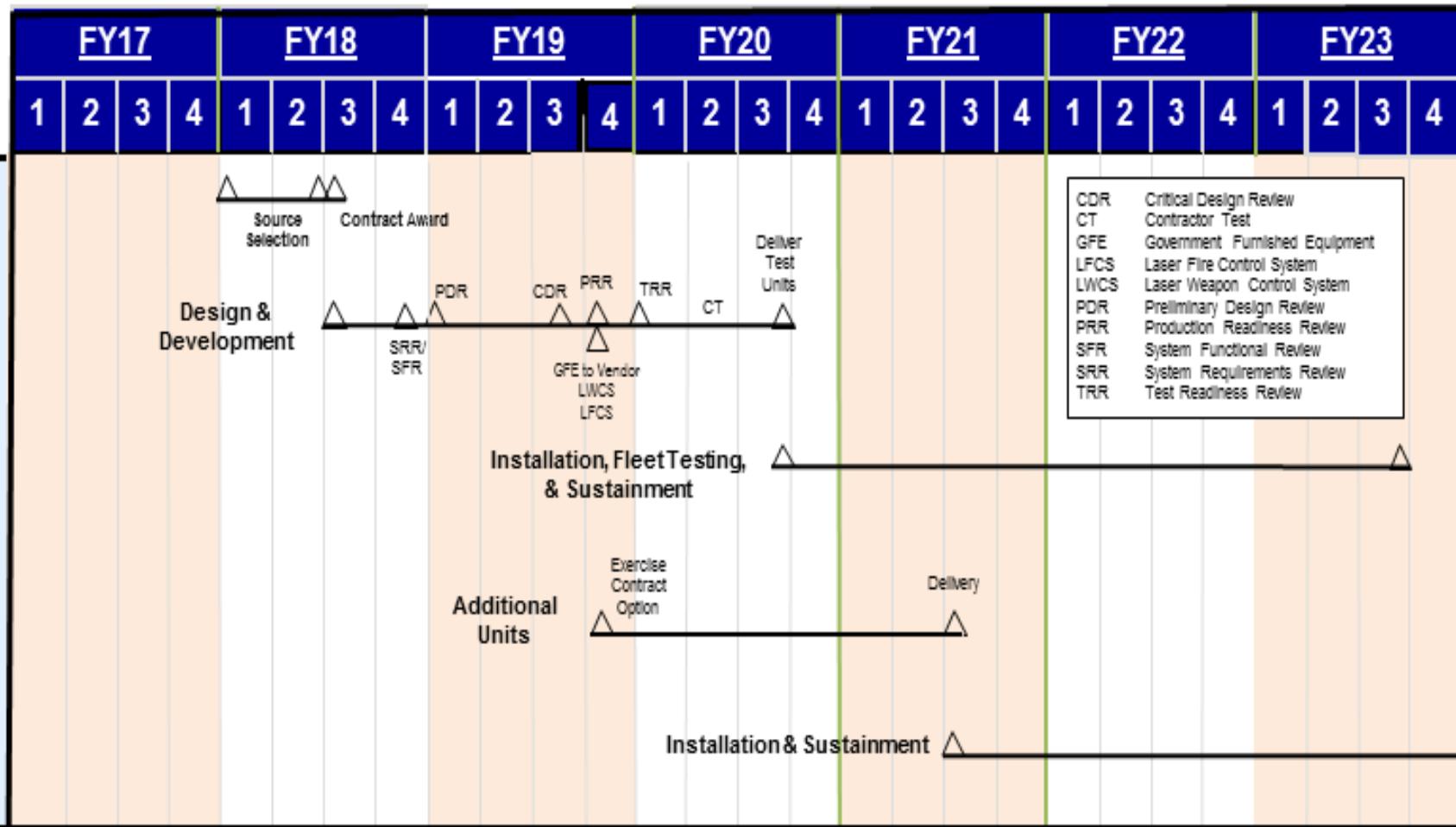
Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603925N / Directed Energy and
Electric Weapon System

Project (Number/Name)

3402 / Surface Navy Laser Weapon System
(SNLWS)

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / <i>Directed Energy and Electric Weapon System</i>	Project (Number/Name) 3402 / <i>Surface Navy Laser Weapon System (SNLWS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3402				
SNLWS: Conduct SNLWS Source Selection	1	2018	2	2018
SNLWS: Contract Award	3	2018	3	2018
SNLWS: Conduct System Requirements Review/System Functional Review	4	2018	4	2018
SNLWS: Preliminary Design Review	1	2019	1	2019
SNLWS: Critical Design Review	3	2019	3	2019
SNLWS: Laser Weapon Control System (LWCS) GFE to Vendor	4	2019	4	2019
SNLWS: Laser Fire Control System (LFCS) GFE to Vendor	4	2019	4	2019
SNLWS: Production Readiness Review (PDR)	4	2019	4	2019
SNLWS: Exercise Contract Option	4	2019	4	2019
SNLWS: Test Readiness Review	1	2020	1	2020
SNLWS: Contractor Test	1	2020	3	2020
SNLWS: Deliver Test Units	3	2020	3	2020
SNLWS: Installation, Fleet Testing and Sustainment	3	2020	3	2023
SNLWS: Deliver Option Units	3	2021	3	2021
SNLWS: Installation and Sustainment	3	2021	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)					
1319 / 4					PE 0603925N / Directed Energy and Electric Weapon System				9823 / Lasers for Navy applicat					
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
9823: Lasers for Navy applicat	22.526	12.302	44.029	33.107	-	33.107	18.254	2.032	2.003	2.143	Continuing	Continuing		
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-				
A. Mission Description and Budget Item Justification														
Project 9823 - Lasers for Navy Applications: Low Power Module (LPM) development will provide near-term, directed energy, shipboard Counter-Intelligence, Surveillance, and Reconnaissance (C-ISR) capabilities to dazzle Unmanned Aerial Systems (UASs) and other platforms that will address urgent operational needs of the Fleet. FY18 is the first year of funding that will support the design, development and procurement of eight standalone units over the FYDP, for deployment on DDG 51 surface combatants. The program will support the non-recurring engineering, development, procurement of long lead material, assembly and checkout, system certification, and platform integration/installation for these eight standalone units.														
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)														
Title: Low Power Module (LPM) Development										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<i>Articles:</i>										12.302	44.029	33.107	0.000	33.107
Description: Beginning in FY 2018, Low Power Module (LPM) development efforts are being renamed Optical Dazzling Interdictor, Navy (ODIN).										-	-	-	-	-
FY 2018 Plans:														
<ul style="list-style-type: none"> - Complete System Engineering of initial design and initiate the detailed design of a train and elevation capability, pointing/tracking mount and associated hardware/software, and beam control software. - Conduct Technical Design Reviews for system subassemblies. - Procure/integrate sensor components (track illumination laser and Battle Damage Assessment (BDA) laser) for Units 1 and 2. - Procure and initiate build Units 3, 4, 5. - Conduct shipboard integration/installation engineering/documentation for DDG 51 class ships. - Perform Assembly and Checkout of Units 1 and 2. - Each unit consists of: Beam Director (Telescope, Optics, Fast Steering Mirrors); Lower Power Lasers (2); Sensors (Coarse Track, Fine Track, ISR Imaging); Computer Rack, Network Switches; and an Operator Laptop. 														
FY 2019 Base Plans:														
<ul style="list-style-type: none"> - Complete system integration, test and certifications, including electromagnetic interference, system operability, and safety. - Complete shipboard documentation and training for ships' crew. 														

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018							
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System		Project (Number/Name) 9823 / Lasers for Navy applicat						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										
			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
<ul style="list-style-type: none"> - Install Units 1 and 2 onboard designated DDG 51 class ships, conduct system turnover, and support shipboard operations. - Complete procurement and build of Units 3, 4, 5. - Perform Assembly and Checkout, and integration of Units 3, 4, 5. - Install Units 3, 4, and 5 onboard designated DDG 51 class ships and initiate shipboard test and checkout. - Procure and initiate build of Units 6, 7, 8. - Each unit consists of: Beam Director (Telescope, Optics, Fast Steering Mirrors); Lower Power Lasers (2); Sensors (Coarse Track, Fine Track, ISR Imaging); Computer Rack, Network Switches; and an Operator Laptop. 										
FY 2019 OCO Plans: N/A.										
FY 2018 to FY 2019 Increase/Decrease Statement: Funding decreased in FY19 as the majority of the engineering development and initiation of material procurement for production of the initial five (5) systems is accomplished in FY18.										
Accomplishments/Planned Programs Subtotals						12.302	44.029	33.107	0.000	33.107
C. Other Program Funding Summary (\$ in Millions)										
N/A										
Remarks										
D. Acquisition Strategy										
The LPM Stand Alone is a government designed, developed, and produced system that will provide eight units for use on DDG 51 class ships. This effort will transition the developed LPM capabilities to the Fleet, while informing the development of future prototyping capabilities and program of record efforts.										
E. Performance Metrics										
<ul style="list-style-type: none"> - Conduct Systems Requirements Review - Conduct Engineering/Program Review - Conduct Design Review - Conduct Prototype Testing/Analysis Review - Conduct Test Plan Review - Conduct Integration & Testing Review - Conduct Analysis and Final Report Review - Produce and install eight units (2 to be installed in FY19, 3 in FY20, and 3 in FY21) 										

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 9823 / Lasers for Navy applicat							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LPM Development	WR	NSWC DD : Dahlgren, VA	4.840	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	WR	SSC PAC : San Diego, CA	1.088	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	WR	NSWC CRANE : Crane, IN	1.520	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	WR	NRL : Washington, D.C.	0.470	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
LPM Development	C/CPFF	BOEING : San Diego, CA	1.349	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Testbed	WR	NSWC DD : Dahlgren, VA	2.727	0.952	May 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Testbed	C/CPFF	PSU EOC : Freeport, PA	1.000	0.500	Jul 2017	1.560	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Hardware & Software - Material Buys	C/FFP	NSWC DD : Dahlgren, VA	0.000	0.000		20.836	Dec 2017	14.461	Dec 2018	-		14.461	Continuing	Continuing	Continuing
Engineering/Development	WR	NSWC DD : Dahlgren, VA	0.274	2.748	May 2017	7.037	Nov 2017	4.362	Nov 2018	-		4.362	Continuing	Continuing	Continuing
Software Development	WR	NSWC DD : Dahlgren, VA	0.000	0.000		4.294	Nov 2017	3.958	Nov 2018	-		3.958	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	PSU EOC : Freeport, PA	0.000	0.000		0.780	Feb 2018	0.350	Dec 2018	-		0.350	Continuing	Continuing	Continuing
Engineering/Development	WR	NSWC PHD : Port Hueneme, CA	0.000	0.155	Jul 2017	0.330	Nov 2017	0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing
Engineering/Development	WR	NSWC Crane : Crane, IN	0.000	0.000		0.500	Nov 2017	0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing
Subtotal			13.268	4.355		35.337		23.531		-		23.531	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 9823 / Lasers for Navy applicat							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems/Mgmt Engineering	C/CPFF	PSU EOC : Freeport, PA	1.724	0.700	May 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Modeling & Simulation	WR	NSWC DD : Dahlgren, VA	0.399	0.560	May 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems/Mgmt Engineering	WR	PATUXENT PARTNERSHIP : Lexington Park, MD	0.202	0.142	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems/Mgmt Engineering	C/CPFF	CSC : Washington, D.C.	0.080	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems/Mgmt Engineering	C/CPFF	NAVFAC : Washington, D.C.	0.000	0.125	Sep 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spares	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.711	Nov 2017	0.811	Nov 2018	-		0.811	Continuing	Continuing	Continuing
Platform Integration/ILS	WR	NSWC DD : Dahlgren, VA	0.519	1.495	May 2017	2.328	Nov 2017	1.771	Nov 2018	-		1.771	Continuing	Continuing	Continuing
Platform Integration	C/CPAF	BIW : Bath, ME	0.000	0.030	Jan 2018	0.107	Feb 2018	0.155	Feb 2019	-		0.155	Continuing	Continuing	Continuing
Platform Integration	WR	NSWC CARDEROCK : Bethesda, MD	0.240	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	C/CPFF	Huntington, Ingalls : Newport News, VA	0.012	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Platform Integration	C/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.000		0.265	Feb 2018	0.270	Feb 2019	-		0.270	Continuing	Continuing	Continuing
Systems Engineering	WR	SSC PAC : San Diego, CA	0.000	0.140	Jul 2017	0.770	Nov 2017	0.550	Nov 2018	-		0.550	Continuing	Continuing	Continuing
Safety, Product Support, Security & Operations	WR	NSWC Dahlgren : Dahlgren, VA	2.514	1.098	May 2017	1.615	Nov 2017	2.300	Nov 2018	-		2.300	Continuing	Continuing	Continuing
Platform Integration	WR	NSWC Crane : Crane, IN	0.000	0.000		0.220	Nov 2017	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Packaging, Handling, Storage & Transportation, De-Install, Refurbishment	C/FFP	PSU EOC : Freeport, PA	0.000	0.425	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 9823 / Lasers for Navy applicat							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Platform Integration/ILS	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		1.430	Nov 2017	0.450	Nov 2018	-		0.450	Continuing	Continuing	Continuing
Packaging, Handling, Storage & Transportation, De-Install, Refurbishment	WR	NSWC DD : Dahlgren, VA	0.000	1.155	Aug 2017	0.088	Nov 2017	0.091	Nov 2018	-		0.091	Continuing	Continuing	Continuing
Subtotal		5.690	5.870		7.534		6.648		-		6.648	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Planning & Execution	WR	PHD NSW : Port Hueneme, CA	0.455	0.150	May 2017	0.275	Nov 2017	0.998	Nov 2018	-		0.998	Continuing	Continuing	Continuing
Test Planning & Execution	WR	NSWC DD : Dahlgren, VA	1.347	0.750	May 2017	0.370	Nov 2017	1.098	Nov 2018	-		1.098	Continuing	Continuing	Continuing
Test Planning & Execution	WR	NSWC Crane : Crane, IN	0.292	0.330	Feb 2017	0.000		0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Test Planning & Execution	MIPR	Kirtland AFB : Albuquerque, NM	0.045	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Planning & Execution	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.100	Nov 2018	-		0.100	Continuing	Continuing	Continuing
Subtotal		2.139	1.230		0.645		2.446		-		2.446	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Mgmt/Support	C/CPFF	GRYPHON Technologies : Washington, D.C.	0.178	0.320	Jul 2017	0.250	Mar 2018	0.250	Mar 2019	-		0.250	Continuing	Continuing	Continuing
Program Mgmt/Support	MIPR	ARDEC : Picatinny Arsenal, NJ	0.822	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System				Project (Number/Name) 9823 / Lasers for Navy applicat							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Safety, Product Support, Security, Operations	WR	NAVFACENG : San Diego, CA	0.030	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Travel	Various	NAVSEA : Washington, D.C.	0.052	0.022	Aug 2017	0.052	Feb 2018	0.052	Feb 2019	-		0.052	Continuing	Continuing	Continuing
Program Mgmt/Support	SS/CPFF	SPA Bridge : Washington, D.C.	0.347	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Mgmt/Support	C/CPIF	SPA : Washington, D.C.	0.000	0.355	Jul 2017	0.211	Feb 2018	0.180	Dec 2018	-		0.180	Continuing	Continuing	Continuing
Program Mgmt/Support	C/CPFF	TMB : Washington, D.C.	0.000	0.150	Aug 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			1.429	0.847		0.513		0.482		-		0.482	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			22.526	12.302		44.029		33.107		-		33.107	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

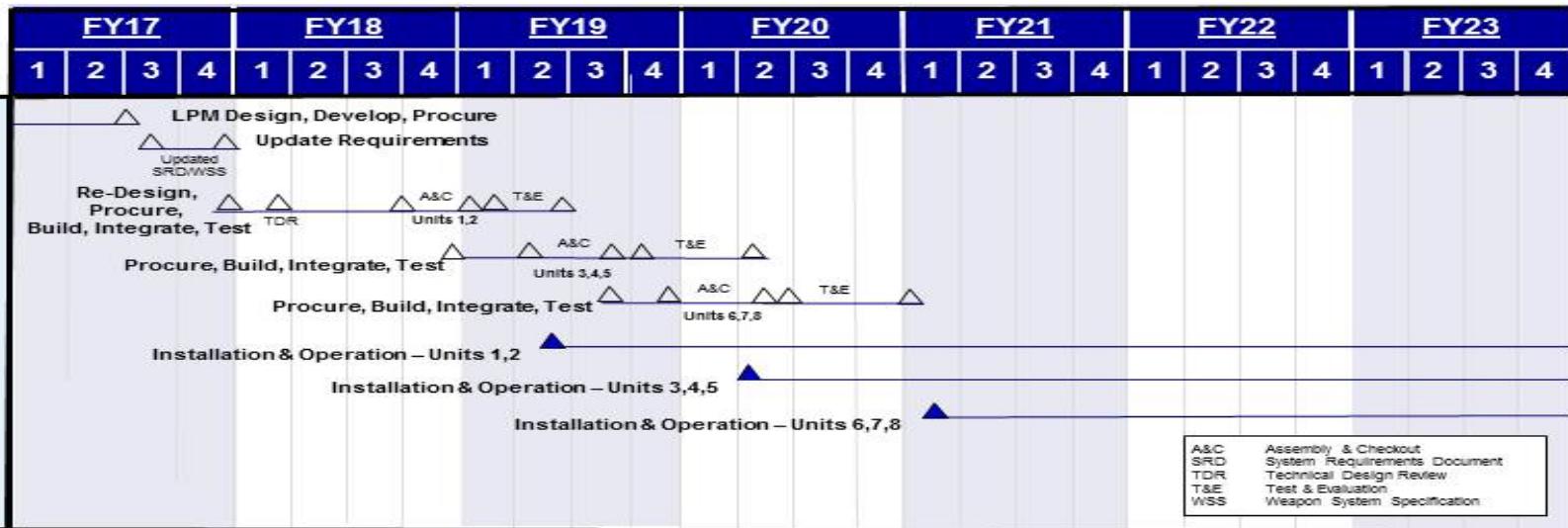
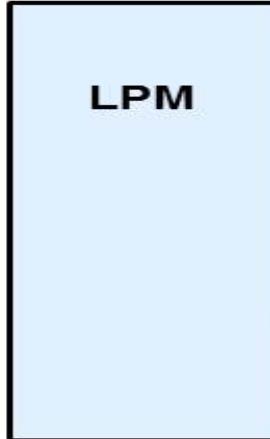
1319 / 4

R-1 Program Element (Number/Name)

PE 0603925N / *Directed Energy and Electric Weapon System*

Project (Number/Name)

9823 / *Lasers for Navy applicat*



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603925N / Directed Energy and Electric Weapon System	Project (Number/Name) 9823 / Lasers for Navy applicat		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Proj 9823				
Engineering		1	2017	4
Design/Develop Operational System		1	2017	4
Initial Component Procurement		1	2017	3
Update Requirements Design		3	2017	4
Technical Design Review (TDR)		1	2018	1
Component Procurement Units 1 and 2		1	2018	4
Assembly & Checkout Units 1 and 2		4	2018	1
Component Procurement Units 3, 4 and 5		4	2018	2
Integration Units 1 and 2		1	2019	1
Test and Evaluation Units 1 and 2		1	2019	3
Installation and Operation Units 1 and 2		2	2019	4
Assembly & Checkout Unit's 3, 4 and 5		2	2019	3
Integration Units 3, 4 and 5		3	2019	3
Component Procurement Units 6, 7 and 8		3	2019	4
Test & Evaluation Unit's 3, 4 and 5		4	2019	2
Assembly & Checkout Unit's 6, 7 and 8		4	2019	2
Integration Units 6, 7 and 8		2	2020	2
Installation and Operation Units 3, 4 and 5		2	2020	4
Test and Evaluation Units 6, 7 and 8		3	2020	1
Installation and Operation Units 6, 7 and 8		1	2021	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604014N / F/A-18 Infrared Search and Track (IRST)										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	0.000	0.000	0.000	108.700	-	108.700	120.927	56.026	5.423	5.553	Continuing	Continuing			
2069: F/A-18 Infrared Search and Track (IRST)	0.000	0.000	0.000	108.700	-	108.700	120.927	56.026	5.423	5.553	Continuing	Continuing			
Program MDAP/MAIS Code:															
Project MDAP/MAIS Code(s): P510															
A. Mission Description and Budget Item Justification															
F/A-18 Infra-Red Search and Track (IRST): The F/A-18 E/F IRST system is a passive long-wave Infra-Red (IR) sensor which provides an alternate fire control system in a high Electronic Attack / Radio Detection and Ranging (RADAR) denied environment. The IRST Block II Engineering Change Proposal (ECP) upgrades two Weapons Replaceable Assemblies (WRAs); the Infra-Red Receiver (IRR) and processor in order to provide full Capabilities Development Document (CDD) capability and enhanced warfighting capability through an improved engagement timeline, improved situational awareness, longer range passive detection and tracking and a larger field of regard with specification performance.															
IRST was previously completed under Program Element 0204136N F/A-18 Squadrons and has been transferred to Program Element 0604014N F/A-18 Infrared Search and Track (IRST).															
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget					0.000	0.000	0.000	-	0.000						
Current President's Budget					0.000	0.000	108.700	-	108.700						
Total Adjustments					0.000	0.000	108.700	-	108.700						
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Program Adjustments 					-	-	-	-	-						
					0.000	0.000	108.700	-	108.700						
Change Summary Explanation															
Technical: Not applicable.															
Schedule: Not applicable.															

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604014N / <i>F/A-18 Infrared Search and Track (IRST)</i>
The FY 2019 funding request was reduced by \$21.973 million to account for the availability of prior year execution balances.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)				Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2069: F/A-18 Infrared Search and Track (IRST)	0.000	0.000	0.000	108.700	-	108.700	120.927	56.026	5.423	5.553	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: P510												
A. Mission Description and Budget Item Justification												
F/A-18 Infra-Red Search and Track (IRST): The F/A-18 E/F IRST system is a passive long-wave Infra-Red (IR) sensor which provides an alternate fire control system in a high Electronic Attack / Radio Detection and Ranging (RADAR) denied environment. The IRST Block II Engineering Change Proposal (ECP) upgrades two Weapons Replaceable Assemblies (WRAs); the Infra-Red Receiver (IRR) and processor in order to provide full Capabilities Development Document (CDD) capability and enhanced warfighting capability through an improved engagement timeline, improved situational awareness, longer range passive detection and tracking and a larger field of regard with specification performance.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
<i>Title:</i> Infra-Red Search and Track (IRST)						<i>Articles:</i>						
<i>Description:</i> Technology development and engineering and manufacturing development of an IRST sensor for the F/A-18 E/F. Block I supported technology development and engineering and manufacturing development of an IRST sensor for the F/A-18E/F to provide an alternate fire control system in a high Electronic Attack / Radio Detection and Ranging (RADAR) denied environment. Block I systems currently in production will be utilized as test assets for continued integration, tactics development and aircrew familiarization; will be upgraded via retrofit to a Block II configuration prior to fleet delivery. Block II IRST upgrades the Infra-Red Receiver (IRR) and processor to provide full Capabilities Development Document (CDD) capability and enhanced warfighting capability through an improved engagement timeline, improved situational awareness, longer range passive detection and tracking and a larger field of regard with specification performance.												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018						
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)				Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)									FY 2017	FY 2018			
equipment. Continue King Air Integration Lab flight testing. Continue Block I/II prototype/EDM conversions and upgrades to full Block II configuration.								FY 2019 Base	FY 2019 OCO	FY 2019 Total			
FY 2019 OCO Plans: N/A													
FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2019 funding request was increased by \$21.707 million over PE 0204136N F/A-18 Squadrons PU 2069 FY18 funding request of \$86.993 million. Additional FY19 costs above the continuation of efforts initiated in Program Element 0204136N F/A-18 Squadrons PU 2069 in FY 2018 include procurement of test asset hardware conversion kits to upgrade from the Block II prototype to an EDM configuration as well as additional lab assets to support testing. Increase in developmental lab testing, data analysis and operational test planning.													
Accomplishments/Planned Programs Subtotals									0.000	0.000			
C. Other Program Funding Summary (\$ in Millions)													
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
• APN/05250: F-18 Series Mod (OSIP 04-14)	0.000	0.000	86.595	-	86.595	88.435	181.810	211.698	177.619	448.004	1,194.161		
Remarks													
D. Acquisition Strategy Infra-Red Search and Track (IRST). The IRST system is an evolutionary Navy acquisition program with Block I and Block II capabilities. The IRST Block I system developed by the Navy provides a basic capability, supported integration of the sensor onto a fuel tank and into the aircraft and supported aeromechanical flight test required for clearance and carrier qualification of the system. IRST Block I is in the Production and Deployment phase following a successful MS-C decision in December 2014 and will support continued integration with the F/A-18E/F Advanced Mission Computer software through flight testing with System Configuration Sets H14 and H16. IRST Block II is an ECP to upgrade two WRAs that will provide full CDD capability. Early risk reduction activities were initiated in FY2016, the program executed a pre-development In Progress Review (IPR 1) in October 2017 and has a planned pre-production IPR (IPR 2) scheduled for 4th Quarter FY2018 leading to a planned low rate initial production (APN-5 funded) start in FY2019 to achieve an Initial Operating Capability (IOC) in 4th Quarter FY2021.													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)	Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)
E. Performance Metrics		
IRST Program achieved MS B on 17 June 2011, achieved MS C on 02 December 2014. IRST Block II Pre-Development IPR-1 was conducted 1st Quarter 2018; Pre-Production IPR-2 is scheduled for 4th Quarter FY 2018. IRST Block II systems are scheduled to begin production in FY2019 and IOC in 4th Quarter FY 2021.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)				Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Development (Hardware/Software) Infra-Red Search and Track (IRST)	Various	Boeing : St. Louis, MO	0.000	0.000		0.000		49.228	Dec 2018	-		49.228	206.813	256.041	256.041
Hardware Development	MIPR	USAF (MIT) : Hanscom AFB, MA	0.000	0.000		0.000		1.020	Nov 2018	-		1.020	Continuing	Continuing	Continuing
Software (S/W) Development	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		3.348	Dec 2018	-		3.348	Continuing	Continuing	Continuing
IRST Support Equipment Development	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		0.050	Nov 2018	-		0.050	Continuing	Continuing	Continuing
Primary Development	Various	NSMA : Various	0.000	0.000		0.000		42.518	Nov 2018	-		42.518	0.000	42.518	-
Subtotal			0.000	0.000		0.000		96.164		-		96.164	Continuing	Continuing	N/A
Remarks NAWCAD Lakehurst, New Jersey, is developing Support Equipment necessary to support the IRST pods. Block II EMD effort ramps up significantly in FY 2019 to support alignment with H16 development and testing in order to achieve IOC in FY 2021.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		1.181	Nov 2018	-		1.181	Continuing	Continuing	Continuing
Development Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		3.136	Nov 2018	-		3.136	Continuing	Continuing	Continuing
Development Support	WR	NSWC : Indian Head, MD	0.000	0.000		0.000		0.060	Nov 2018	-		0.060	Continuing	Continuing	Continuing
Development Support	WR	NAWCWD : Pt. Mugu, CA	0.000	0.000		0.000		0.022	Dec 2018	-		0.022	Continuing	Continuing	Continuing
Development Support	WR	FRC Southeast : Jacksonville, FL	0.000	0.000		0.000		0.890	Nov 2018	-		0.890	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)						Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)			
Support (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	C/CPFF	NRL : Washington, DC	0.000	0.000		0.000		0.350	Dec 2018	-		0.350	0.000	0.350	0.350
Development Support	WR	NAVSUP : Mechanicsburg, PA	0.000	0.000		0.000		0.042	Jan 2019	-		0.042	0.000	0.042	-
Obsolescence Redesign	Various	Various : Various	0.000	0.000		0.000		0.255	Dec 2018	-		0.255	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		5.936		-		5.936	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		1.696	Nov 2018	-		1.696	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	NAWCWD : China Lake, CA	0.000	0.000		0.000		2.183	Nov 2018	-		2.183	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	WR	OPTEVFOR : VX-9	0.000	0.000		0.000		1.500	Dec 2018	-		1.500	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E) - CSS	Various	OPTEVFOR : VX-9	0.000	0.000		0.000		0.120	Jul 2019	-		0.120	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E) - CSS	Various	OPTEVFOR : Norfolk, VA	0.000	0.000		0.000		0.100	Mar 2019	-		0.100	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		5.599		-		5.599	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Various	NAVAIR : Patuxent River, MD	0.000	0.000		0.000		0.020	Oct 2018	-		0.020	Continuing	Continuing	Continuing
Program Management Support - MISC	Various	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.981	Oct 2018	-		0.981	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy											Date: February 2018					
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)				Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)						
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Subtotal			0.000	0.000		0.000		1.001		-		1.001	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		0.000		108.700		-		108.700	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity												R-1 Program Element (Number/Name)				Project (Number/Name)									
1319 / 4												PE 0604014N / F/A-18 Infrared Search and Track (IRST)				2069 / F/A-18 Infrared Search and Track (IRST)									
Infra-Red Search and Track	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Acquisition Milestones																									
Milestones																									
System Development																									
Engineering and Manufacturing Development																									
Development Testing																									
IRST Block II Software																									
Reviews																									
Test and Evaluation																									
Aircraft Software Release																									
Integration Testing																									
Operational Testing																									
Production Milestones																									
Contract Awards																									
Deliveries																									
LRIP 3 (APN)																									
Prototypes																									
LRIP 4 (APN)																									
EDMs																									
LRIP 5 (APN)																									
LRIP3 (BII-Q6)																									
LRIP 6 (APN)																									
LRIP4 (BII-Q12)																									
LRIP5 (BII-Q25)																									

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)	Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Infra-Red Search and Track				
Acquisition Milestones: Milestones: Full Rate Production Decision Review (FRP DR)	3	2021	3	2021
Acquisition Milestones: Milestones: Gate 6 / CSB (IPR 3)	3	2019	3	2019
Acquisition Milestones: Milestones: Gate 6 / CSB (IPR 4)	3	2020	3	2020
Acquisition Milestones: Milestones: Initial Operating Capability (IOC)	4	2021	4	2021
System Development: Engineering and Manufacturing Development: Block II ECP Hardware Development	1	2019	1	2021
System Development: Engineering and Manufacturing Development: Sensor Hardware Conversion and Upgrades (Block I/II Prototype & EDM)	1	2019	4	2020
System Development: Development Testing: King Air Integration Lab Block II Phase I	1	2019	1	2019
System Development: Development Testing: King Air Integration Lab Block II Phase II	2	2019	3	2019
System Development: Development Testing: Block II Test Asset Lab Testing	2	2019	4	2020
System Development: Development Testing: Block II Test Asset Flight Test	3	2019	1	2021
System Development: IRST Block II Software: IRST OPP SW B3	1	2019	2	2019
System Development: IRST Block II Software: IRST OPP SW B4	3	2019	1	2020
System Development: IRST Block II Software: IRST OPP SW Performance Tuning & Modification	2	2020	1	2021
System Development: Reviews: Technology Readiness Review (TRR)	4	2019	4	2019
Test and Evaluation: Aircraft Software Release: SCS H14 Fleet Release	4	2019	4	2019
Test and Evaluation: Aircraft Software Release: SCS H16 Fleet Release	4	2021	4	2021
Test and Evaluation: Integration Testing: SCS H16 Integration Testing	1	2019	1	2020
Test and Evaluation: Operational Testing: SCS H14 Operational Evaluation	1	2019	2	2019
Test and Evaluation: Operational Testing: Verification of Correction of Deficiencies	1	2022	4	2023

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604014N / F/A-18 Infrared Search and Track (IRST)	Project (Number/Name) 2069 / F/A-18 Infrared Search and Track (IRST)		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	2	2020	4	2020
	1	2021	2	2021
	1	2019	1	2019
	1	2020	1	2020
	1	2021	1	2021
	1	2022	1	2022
	1	2019	3	2019
	2	2020	3	2020
	2	2019	2	2020
	2	2021	3	2021
	2	2022	1	2023
	2	2023	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018									
Appropriation/Budget Activity					R-1 Program Element (Number/Name)															
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604027N / Digital Warfare															
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost								
Total Program Element	0.000	0.000	0.000	26.691	-	26.691	26.120	25.944	25.942	26.466	Continuing	Continuing								
3425: Digital Warfare Office (DWO) MBE&DT Development	0.000	0.000	0.000	26.691	-	26.691	26.120	25.944	25.942	26.466	Continuing	Continuing								
Note																				
Digital Warfare (DW) previously funded in PE 0604231N (Tactical Command System), 0603582N (Combat System Integration), and 0605217N (Common Avionics) in FY18 under DW Proj 3425.																				
A. Mission Description and Budget Item Justification																				
The Digital Warfare (DW) supports systems of systems requirements modeling and allocation, development of data technical baselines, digital architectures and data models, and provides data science for enterprise and warfare pilots in support of a composeable, modular Navy.																				
B. Program Change Summary (\$ in Millions)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total													
Previous President's Budget			0.000	0.000	0.000	-	0.000													
Current President's Budget			0.000	0.000	26.691	-	26.691													
Total Adjustments			0.000	0.000	26.691	-	26.691													
• Congressional General Reductions			-	-																
• Congressional Directed Reductions			-	-																
• Congressional Rescissions			-	-																
• Congressional Adds			-	-																
• Congressional Directed Transfers			-	-																
• Reprogrammings			-	-																
• SBIR/STTR Transfer			-	-																
• Program Adjustments			0.000	0.000	26.691	-	26.691													
Change Summary Explanation																				
The Increase between FY18 to FY19 is attributed to Model Based Systems Engineering teams creating Data Technical Baselines for programs of record. Additionally, the increase supports the creation of the modeling environment and modeling standards and policies.																				
Technical: Not applicable.																				
Schedule: Not applicable.																				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare					Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3425: <i>Digital Warfare Office (DWO) MBE&DT Development</i>	0.000	0.000	0.000	26.691	-	26.691	26.120	25.944	25.942	26.466	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

Digital Warfare (DW) previously funded in PE 0604231N (Tactical Command System), 0603582N (Combat System Integration), and 0605217N (Common Avionics) in FY18 under DW Proj 3425.

A. Mission Description and Budget Item Justification

The DW technical initiatives directly support the Chief of Naval Operations (CNO) vision of inherent interoperability across the Navy enabling faster deployment of capabilities to the warfighter.

Naval Air Systems Command (NAVAIR), Naval Sea Systems Command (NAVSEA), Space and Naval Warfare Command (SPAWAR), associated Program Executive Offices (PEOs), warfare and system centers and University Affiliated Research Centers (UARCs)/Federally Funded Research and Development Centers (FFRDCs) will support the Model Based Systems Engineering (MBSE), Technical Design, and Requirements branches in the new DW under Office of the Chief of Naval Operations (OPNAV) N2N6. In order to develop capability from the top down, the DW will develop requirements for the System of Systems (SoS) to include all of the associated interoperability requirements. Due to the complexity of this work, the DW will evolve the traditional requirements development methodology to a MBSE environment that will include associated model extensions, reports, views, configuration management, help desk support, and documentation. This work will be completed by a series of teams, each focused on a separate threat domain, and made up of system modelers, fleet representatives, Program of Record (PoR) representatives, architecture, and interoperability experts. The products generated by these teams will include data technical baselines for domain areas with individual profiles for each program of record, coordinated requirements recommendations, and potential areas for Science and Technology (S&T) and experimentation to fill gaps. The DW will include emerging digital technologies including human/machine teaming.

Each Systems Command (SYSCOM) will be involved in creating Data Technical Baseline (DTB) profiles specific for each PoR. DTBs will consist of interfaces, protocols, content, information quality, architectural aspects, and knowledge base frameworks. SYSCOMs will exercise technical authority to assess PoR compliance to DTBs and Key Performance Parameters (KPPs) in support of gate reviews and system engineering technical reviews.

DW funding supports development of requirements modeling and data science experimentation environment, mission area model-based engineering (MBE) teams, development of digital technical baselines, development of digital architectures, and the development of workforce training in model-based systems engineering.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
0.000	0.000	10.342	0.000	10.342

Title: Digital Warfare (DW) Model Based Systems Engineering (MBSE)

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
1319 / 4	PE 0604027N / Digital Warfare	3425 / Digital Warfare Office (DWO) MBE&DT Development			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
					Articles:
FY 2018 Plans: FY18 Digital Warfare funding resides under PE 0604231N.					FY 2017 - FY 2018 - FY 2019 Base - FY 2019 OCO - FY 2019 Total -
FY 2019 Base Plans: -Provide SME support for the domain functional decomposition based on prioritized mission areas to include Anti-Submarine Warfare, Surface Warfare, Electronic Warfare and Air Warfare. -Continue to establish and implement required extensions to model requirements trace and reports that will be used in the JCIDS process. -Continue to validate current standards across the SYSCOMs to form the overarching Navy DTB in order to facilitate tailoring of each standard for the PoR DTB. -Continue to validate different SYSCOM architectures and guidance to produce a Navy-wide high level architectural framework. -Continue to develop functional baseline architecture of Navy capabilities that maps back to mission threads. -Tune configuration of, and cyber monitor, the distributed Model Based Systems Engineering (MBSE) and data science prototype environment for remote accessibility over a given network enclave, including but not limited to Non-Secure Internet Protocol Router (NIPR), Secure Internet Protocol Router (SIPR), and JointWorldwide Intelligence Communications System (JWICS). Investigate cloud computing with respect to the modeling environment. -Continue to integrate cyber requirements across all Digital Warfare (DW) architecture and standard efforts and verify cyber requirements are captured as part of the modeling process. -Continue to provide subject matter expert support for data science teams in the exploration of data analysis, information and knowledge extraction techniques and application to mission area requirements. -Continue to participate in the definition of MBSE tool functionality and views based on Echelon I stakeholder requirements. Collaboratively develop tool extensions to complement Joint Capabilities Integration and Development System (JCIDS) and Program Objective Memorandum (POM) processes. -Curate models in the modeling environment and support development across Systems Commands (SYSCOMs) in Modeling Standards and Policies for Science and Technology (S&T) and Programs of Record (PoRs). -Develop an overarching Data Technical Baseline (DTB) and DTB profiles for PoRs under SYSCOM cognizance. Assess PoRs against their DTB profile during all Systems Engineering Technical Review events and gate reviews.					
FY 2019 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare	Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
<p>FY 2018 to FY 2019 Increase/Decrease Statement: The \$4,392K increase between FY18 to FY19 is attributed to Model Based Systems Engineering teams creating Data Technical Baselines for programs of record. Additionally, the increase supports the creation of the modeling environment and modeling standards and policies.</p> <p>Title: DIGITAL WARFARE Articles:</p> <p>FY 2018 Plans: FY18 Digital Warfare funding resides under PE 0605217N.</p> <p>FY 2019 Base Plans: Provide Subject Matter Expert support for the domain functional decomposition based on prioritized mission areas to include Anti-Submarine Warfare, Surface Warfare, Electronic Warfare and Air Warfare. Support the analytical agenda from OPNAV N81 and N91 for the specific mission area capabilities. Provide modeling and documentation support for Joint Capability Integration Development System (JCIDS), OPNAV Program Objective Memorandum (POM) process, and ASN Acquisition Process. Coordinate and work across the SYSCOMs and PEOs on the OPNAV Model Based Systems Engineering (MBSE) requirements allocation process. Develop an overarching Data Technical Baseline and profile for Program of Records (POR) under SYSCOM cognizance. Assess PORs against their profile during all Systems Engineering Technical Review events and gate reviews.</p> <p>Participate in the definition of MBSE tool functionality and views based on Echelon I stakeholder requirements. Collaboratively develop tool extensions to complement JCIDS and POM processes. Support development of cross-SYSCOM Modeling Standards and Policies for Science and Technology and Program of Records.</p> <p>Provide Subject Matter Expert support for data science teams in data exploration and analysis, information and knowledge extraction techniques, and application to mission area data requirements in support of enterprise productivity and warfighting pilots. Explore Machine Learning techniques to support human/machine teaming for decision making.</p>						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018					
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare	Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Provide common infrastructure for Model Based System Engineering and Data Technical Baseline environments, to include access management, configuration management, and help desk support.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Increases between FY18 to FY19 are for DW Model Based System Engineering (MBSE) and Data Technical Baseline (DTB) ensuring technical baseline standup in FY20.								
Title: SYSCOM/PEO DW Support	Articles:	0.000	0.000	7.810	0.000	7.810		
FY 2018 Plans: FY18 funding for Digital Warfare resides in PE 0603582N.		-	-	-	-	-	-	
FY 2019 Base Plans: <ul style="list-style-type: none"> -Provide Subject Matter Expert (SME) support for the domain functional decomposition based on prioritized mission areas to include Anti-Submarine Warfare, Surface Warfare, Electronic Warfare and Air Warfare. -Continue to establish and implement required extensions to model requirements trace and reports that will be used in the JCIDS process. -Continue to validate current standards across the SYSCOMs to form the overarching Navy DTB in order to facilitate tailoring of each standard for the PoR DTB. -Continue to validate different SYSCOM architectures and guidance to produce a Navy-wide high level architectural framework. -Continue to develop functional baseline architecture of Navy capabilities that maps back to mission threads. -Tune configuration of, and cyber monitor, the distributed MBSE and data science prototype environment for remote accessibility over a given network enclave, including but not limited to NIPR, SIPR, and JWICS. Investigate cloud computing with respect to the modeling environment. -Continue to integrate cyber requirements across all DW architecture and standard efforts and verify cyber requirements are captured as part of the modeling process. -Continue to provide subject matter expert support for data science teams in the exploration of data analysis, information and knowledge extraction techniques and application to mission area requirements. -Continue to participate in the definition of Model Based Systems Engineering (MBSE) tool functionality and views based on Echelon I stakeholder requirements. Collaboratively develop tool extensions to complement 								

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare		Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Joint Capabilities Integration and Development System (JCIDS) and Program Objective Memorandum (POM) processes. -Curate models in the modeling environment and support development across Systems Commands (SYSCOMs) in Modeling Standards and Policies for Science and Technology (S&T) and Programs of Record (PoRs). -Develop an overarching Data Technical Baseline (DTB) and DTB profiles for PoRs under SYSCOM cognizance. Assess PoRs against their DTB profile during all Systems Engineering Technical Review events and gate reviews.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increase for Digital Warfare (DW) MBSE Data Technical Baseline standup.					
Accomplishments/Planned Programs Subtotals		0.000	0.000	26.691	0.000
C. Other Program Funding Summary (\$ in Millions)					
N/A					
Remarks					
D. Acquisition Strategy DW is a non-acquisition effort that informs and matures Navy decisions, which in turn impacts acquisition programs.					
E. Performance Metrics Digital Warfare (DW) Performance Metrics: Goal: Chief of Naval Operations (CNO) to set requirement, to prioritize resources, and lead efforts on information interoperability and human/machine testing. Metric: Echelon I development of requirements associated with modeling, data science experimentation environment, and digital architectures. The DW will set requirements, prioritize resources, and lead efforts on information interoperability and human/machine teaming. This will result in a workforce that is trained in new systems engineering and modeling concepts and tools. It will also result in development of a requirements modeling environment to include associated model extensions, reports, views, and configuration management and in the development of digital technical baselines for programs to use to ensure cross-domain interoperability.					

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare				Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital Warfare (DW)	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		1.052	Dec 2018	-		1.052	Continuing	Continuing	Continuing
Digital Warfare (DW)	WR	SSC LANT : Charleston, SC	0.000	0.000		0.000		1.228	Dec 2018	-		1.228	Continuing	Continuing	Continuing
Digital Warfare (DW)	FFRDC	MITRE : McLean, VA	0.000	0.000		0.000		0.615	Nov 2018	-		0.615	Continuing	Continuing	Continuing
Digital Warfare (DW)	C/CPFF	VENCORE : Chantilly, VA	0.000	0.000		0.000		4.026	Dec 2018	-		4.026	Continuing	Continuing	Continuing
Digital Warfare (DW)	C/CPFF	SAIC : McLean, VA	0.000	0.000		0.000		3.421	Jan 2019	-		3.421	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		10.342		-		10.342	Continuing	Continuing	N/A
Remarks															
The Digital Warfare (DW) previously funded in PE 0604231N (Tactical Command System), 0603582N (Combat System Integration), and 0605217N (Common Avionics) in FY18 under DW Proj 3425.															
The \$4,392K increase to Product Development between FY18 to FY19 is attributed to Model Based Systems Engineering teams creating Data Technical Baselines for programs of record. Additionally, the increase supports the creation of the modeling environment and modeling standards and policies.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital Warfare Support	WR	Naval Air War : Patuxent River, MD	0.000	0.000		0.000		2.482	Oct 2018	-		2.482	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		2.482		-		2.482	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DW	WR	NSWCs : Various	0.000	0.000		0.000		3.455	Dec 2018	-		3.455	Continuing	Continuing	Continuing
DW	WR	NUWC : Various	0.000	0.000		0.000		2.355	Dec 2018	-		2.355	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare						Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development			
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DW	C/CPFF	Various : Various	0.000	0.000		0.000		2.000	Dec 2018	-		2.000	Continuing	Continuing	Continuing
Subtotal				0.000	0.000	0.000		7.810		-		7.810	Continuing	Continuing	N/A
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Engineer Support	Various	Various : Various	0.000	0.000		0.000		6.057	Dec 2018	-		6.057	Continuing	Continuing	Continuing
Subtotal				0.000	0.000	0.000		6.057		-		6.057	Continuing	Continuing	N/A
Remarks Funding Increased due to MBSE Data Technical Baseline standup.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		26.691		-		26.691	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

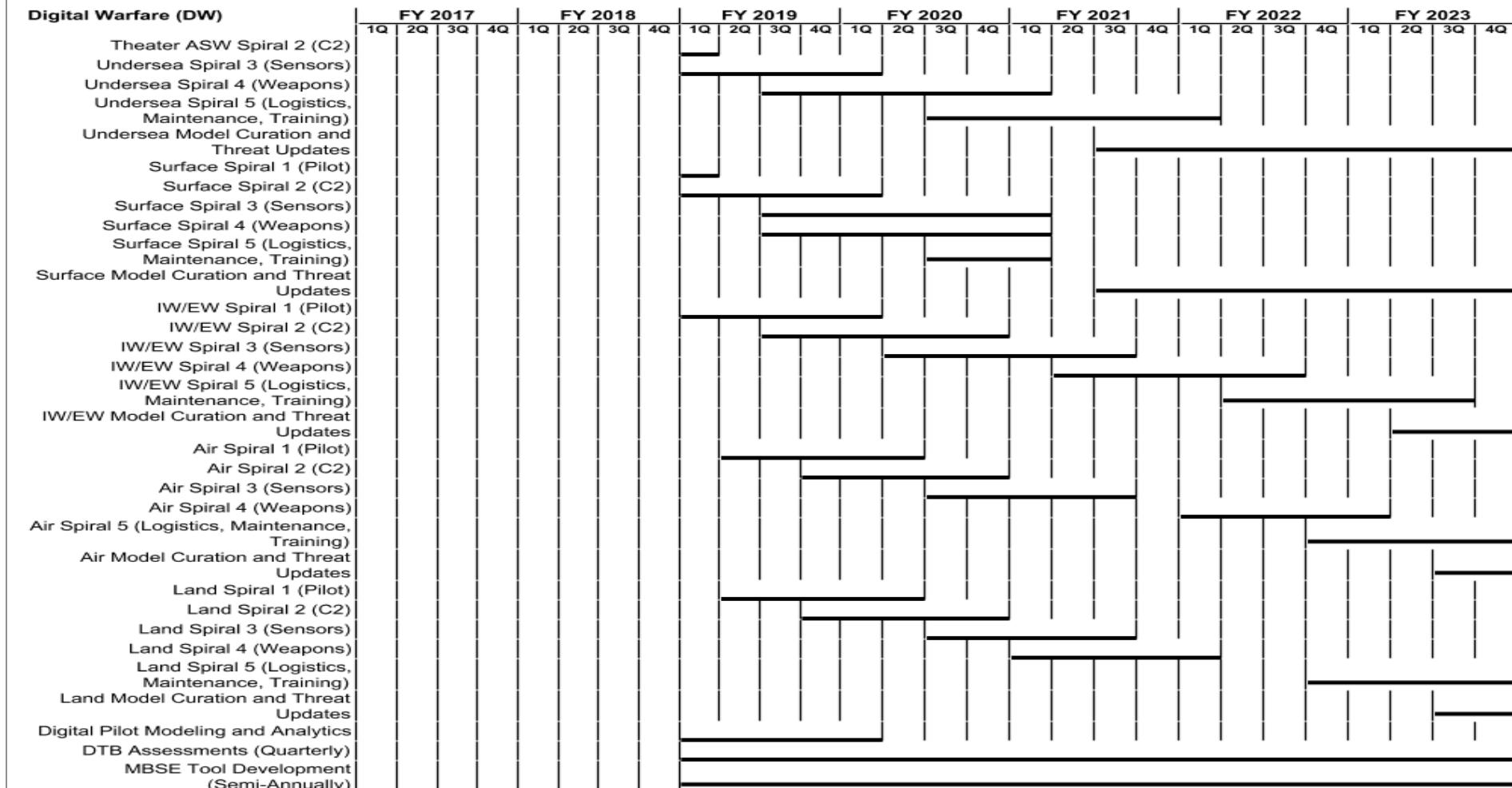
1319 / 4

R-1 Program Element (Number/Name)

PE 0604027N | *Digital Warfare*

Project (Number/Name)

3425 I Digital Warfare Office (DWO)
MBE&DT Development



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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604027N / <i>Digital Warfare</i>	Project (Number/Name) 3425 / <i>Digital Warfare Office (DWO)</i> <i>MBE&DT Development</i>
2019PB - 0604027N - 3425.L39		

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

2019PB - 0604027N - 3425.S19

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018															
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)															
1319 / 4								PE 0604027N / Digital Warfare								3425 / Digital Warfare Office (DWO) MBE&DT Development															
Proj 3425.S24								FY 2017								FY 2018															
								1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q							
DW								Surface Requirements								FY 2019								FY 2020							
								Gap Analysis								FY 2021								FY 2022							
								Air Requirements								FY 2023								FY 2024							
								Model IW Req								FY 2025								FY 2026							
								Gap Analysis								IW Requirements								FY 2027							

2019PB - 0604027N - 3425.S24

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604027N / <i>Digital Warfare</i>	Project (Number/Name) 3425 / <i>Digital Warfare Office (DWO)</i> <i>MBE&DT Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Digital Warfare (DW)				
Theater ASW Spiral 2 (C2): Theater ASW Spiral 2 (C2)	1	2019	1	2019
Undersea Spiral 3 (Sensors): Undersea Spiral 3 (Sensors)	1	2019	1	2020
Undersea Spiral 4 (Weapons): Undersea Spiral 4 (Weapons)	3	2019	1	2021
Undersea Spiral 5 (Logistics, Maintenance, Training): Undersea Spiral 5 (Logistics, Maintenance, Training)	3	2020	1	2022
Undersea Model Curation and Threat Updates: Undersea Model Curation and Threat Updates	3	2021	4	2023
Surface Spiral 1 (Pilot): Surface Spiral 1 (Pilot)	1	2019	1	2019
Surface Spiral 2 (C2): Surface Spiral 2 (C2)	1	2019	1	2020
Surface Spiral 3 (Sensors): Surface Spiral 3 (Sensors)	3	2019	1	2021
Surface Spiral 4 (Weapons): Surface Spiral 4 (Weapons)	3	2019	1	2021
Surface Spiral 5 (Logistics, Maintenance, Training): Surface Spiral 5 (Logistics, Maintenance, Training)	3	2020	1	2021
Surface Model Curation and Threat Updates: Surface Model Curation and Threat Updates	3	2021	4	2023
IW/EW Spiral 1 (Pilot): IW/EW Spiral 1 (Pilot)	1	2019	1	2020
IW/EW Spiral 2 (C2): IW/EW Spiral 2 (C2)	3	2019	4	2020
IW/EW Spiral 3 (Sensors): IW/EW Spiral 3 (Sensors)	2	2020	3	2021
IW/EW Spiral 4 (Weapons): IW/EW Spiral 4 (Weapons)	2	2021	3	2022
IW/EW Spiral 5 (Logistics, Maintenance, Training): IW/EW Spiral 5 (Logistics, Maintenance, Training)	2	2022	3	2023
IW/EW Model Curation and Threat Updates: IW/EW Model Curation and Threat Updates	2	2023	4	2023

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604027N / Digital Warfare	Project (Number/Name) 3425 / Digital Warfare Office (DWO) MBE&DT Development		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Air Spiral 1 (Pilot): Air Spiral 1 (Pilot)	2	2019	2	2020
Air Spiral 2 (C2): Air Spiral 2 (C2)	4	2019	4	2020
Air Spiral 3 (Sensors): Air Spiral 3 (Sensors)	3	2020	3	2021
Air Spiral 4 (Weapons): Air Spiral 4 (Weapons)	1	2022	1	2023
Air Spiral 5 (Logistics, Maintenance, Training): Air Spiral 5 (Logistics, Maintenance, Training)	4	2022	4	2023
Air Model Curation and Threat Updates: Air Model Curation and Threat Updates	3	2023	4	2023
Land Spiral 1 (Pilot): Land Spiral 1 (Pilot)	2	2019	2	2020
Land Spiral 2 (C2): Land Spiral 2 (C2)	4	2019	4	2020
Land Spiral 3 (Sensors): Land Spiral 3 (Sensors)	3	2020	3	2021
Land Spiral 4 (Weapons): Land Spiral 4 (Weapons)	1	2021	1	2022
Land Spiral 5 (Logistics, Maintenance, Training): Land Spiral 5 (Logistics, Maintenance, Training)	4	2022	4	2023
Land Model Curation and Threat Updates: Land Model Curation and Threat Updates	3	2023	4	2023
Digital Pilot Modeling and Analytics: Digital Pilot Modeling and Analytics	1	2019	1	2020
DTB Assessments (Quarterly): DTB Assessments (Quarterly)	1	2019	4	2023
MBSE Tool Development (Semi-Annually): MBSE Tool Development (Semi-Annually)	1	2019	4	2023
Support: DW Support	1	2019	4	2023
DW: Develop Surface Requirements	1	2019	1	2019
DW: Air Functional Gap Analysis	1	2019	1	2019
DW: Develop Air Requirements	1	2019	3	2019
DW: Model IW Capabilities/Req	1	2019	1	2019
DW: IW Functional Gap Analysis	1	2019	2	2019
DW: Develop IW Requirements	2	2019	1	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604028N / Small and Medium Unmanned Undersea Vehicles							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	16.717	-	16.717	22.747	23.598	24.031	24.031	Continuing	Continuing
3123: SMCM UUV	0.000	0.000	0.000	16.717	-	16.717	22.747	23.598	24.031	24.031	Continuing	Continuing

Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Projects realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

Part of the mine countermeasure systems mission is to provide minehunting capabilities to counter known and projected mine threats in support of minehunting operations worldwide, including intelligence and oceanographic capabilities that will enable mine warfare superiority. The Knifefish Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) is part of the UUV Family of Systems and is part of the MCM Mission Package (MP).

In order to accelerate future capability and support steady growth of the fleet's UUV FoS the Knifefish SMCM UUV program develops advanced Unmanned Undersea Vehicles (UUVs) to support clandestine mine detection capability against volume, bottom, and buried mines. Equipment includes vehicles and associated systems support equipment. In parallel, Pre-Planned Product Improvement (P3I) design efforts are ongoing to support insertion of incremental capability when the technology is ready. Planned P3I candidates being considered include increased detection range capability, communications upgrades, on-board sonar processing and target recognition, command and control improvements, and other smaller tasks, as well as future payloads as required.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	16.717	-	16.717
Total Adjustments	0.000	0.000	16.717	-	16.717
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	16.717	-	16.717

Change Summary Explanation

Program Changes:

FY19 +\$16,717K transfer to new Program Element from 0603502N.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604028N / <i>Small and Medium Unmanned Undersea Vehicles</i>
Technical: Not applicable. Schedule: Not applicable.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604028N / Small and Medium Unmanned Undersea Vehicles				Project (Number/Name) 3123 / SMCM UUV			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3123: SMCM UUV	0.000	0.000	0.000	16.717	-	16.717	22.747	23.598	24.031	24.031	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Projects realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

As part of the UUV FOS and in support of the MCM MP, the Knifefish Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) program develops advanced Unmanned Undersea Vehicles (UUVs) to support clandestine mine detection capability against volume, bottom, and buried mines. Equipment includes vehicles and associated systems support equipment. In parallel, Pre-Planned Product Improvement (P3I) design efforts are ongoing to support insertion of incremental capability when the technology is ready. Planned P3I candidates being considered include increased detection range capability, communications upgrades, on-board sonar processing and target recognition, command and control improvements, and other smaller tasks, as well as potential future payloads as required.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Knifefish Development					0.000	0.000	8.600	0.000	8.600
					<i>Articles:</i>	-	-	-	-
FY 2018 Plans:									
FY 2018 funding in Program Element (PE) 0603502N.									
FY 2019 Base Plans:									
Complete P3I Block 1 development. Commence P3I effort for Block 2 systems (onboard processing and re-acquisition/ID). Conduct developmental efforts for Support systems (processing container, Launch & Recovery, etc.). Achieve Full Rate Production Decision. Perform engineering efforts related to issuing Request for Proposal (RFP) for Full Rate Production.									
FY 2019 OCO Plans:									
N/A									
FY 2018 to FY 2019 Increase/Decrease Statement:									
FY 2018 funding in Program Element (PE) 0603502N. FY 2019 decrease due to completion of E&MD phase transitioning to P3I efforts.									
Title: Knifefish Support					0.000	0.000	3.472	0.000	3.472
					<i>Articles:</i>	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / Small and Medium Unmanned Undersea Vehicles	Project (Number/Name) 3123 / SMCM UUV				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.						
FY 2019 Base Plans: Provide engineering support for existing EDM systems. Support procurement of LRIP systems as well as issuing RFP for Full Rate Production.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 decrease due to completion of E&MD phase transitioning to P3I efforts.						
Title: Knifefish Test and Evaluation	Articles:	0.000	0.000	3.410	0.000	3.410
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.		-	-	-	-	-
FY 2019 Base Plans: Conduct Knifefish system developmental testing related to P3I efforts, Operational Testing from LCS, and other testing from Vessels of Opportunity (VOO), as required.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase to conduct full Operational Test (OT) from LCS.						
Title: Knifefish Management	Articles:	0.000	0.000	1.235	0.000	1.235
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.		-	-	-	-	-
FY 2019 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604028N / Small and Medium Unmanned Undersea Vehicles					Project (Number/Name) 3123 / SMCM UUV						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)															
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total											
Conduct acquisition and management of development, procurement, and program activities including Full Rate Production Decision and issuing RFP for Full Rate Production.															
FY 2019 OCO Plans: N/A															
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 minor increase due to preparing to transition to Full Rate Production (FRP).															
Accomplishments/Planned Programs Subtotals					0.000	0.000	16.717	0.000	16.717						
C. Other Program Funding Summary (\$ in Millions)															
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
• OPN/2622: Minesweeping Replacement	26.764	31.531	35.709	-	35.709	55.949	51.338	34.007	16.753	Continuing	Continuing				
• OPN/1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,501.531	2,771.262				
• RDTEN/0603502N/3123: SMCM UUV	20.890	25.052	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	181.472				
Remarks The above OPN funding lines account for several programs, of which the Knifefish program is only a portion.															
D. Acquisition Strategy The Knifefish program was initiated in FY11 to develop Surface Mine Countermeasure Unmanned Undersea Vehicles (SMCM UUV) equipped with advanced Low FrequencyBroadband (LFBB) sonar that provides volume, bottom, and buried mine detection capability. Procurement of the SMCM UUV with LFBB will occur after Milestone C.															
E. Performance Metrics Successful Milestone C in 3Q FY 2018 and FRP decision in FY 2019.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604028N / Small and Medium Unmanned Undersea Vehicles				Project (Number/Name) 3123 / SMCM UUV							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Knifefish Development & Engineering Support	C/CPIF	General Dynamics AIS : McLeansville, NC	0.000	0.000		0.000		2.000	Dec 2018	-		2.000	Continuing	Continuing	Continuing
Hardware/Software Development - Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.500	Dec 2018	-		0.500	Continuing	Continuing	Continuing
Knifefish P3I Development Contractor	C/CPIF	GDMS : McLeansville, NC	0.000	0.000		0.000		6.100	Nov 2018	-		6.100	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		8.600		-		8.600	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding in Program Element (PE) 0603502N.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.500	Dec 2018	-		0.500	Continuing	Continuing	Continuing
Engineering Support	WR	NUWC, Newport : NEWPORT, RI	0.000	0.000		0.000		0.250	Dec 2018	-		0.250	Continuing	Continuing	Continuing
Engineering Support	WR	VARIOUS : VARIOUS	0.000	0.000		0.000		0.500	Dec 2018	-		0.500	Continuing	Continuing	Continuing
Engineering Support P3I	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.480	Dec 2018	-		0.480	Continuing	Continuing	Continuing
Engineering Support P3I	WR	NUWC, Newport : NEWPORT, RI	0.000	0.000		0.000		0.220	Dec 2018	-		0.220	Continuing	Continuing	Continuing
Engineering Support P3I	WR	VARIOUS : VARIOUS	0.000	0.000		0.000		1.522	Nov 2018	-		1.522	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		3.472		-		3.472	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604028N / Small and Medium Unmanned Undersea Vehicles						Project (Number/Name) 3123 / SMCM UUV			
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government T&E Support	WR	VARIOUS : VARIOUS	0.000	0.000		0.000		2.150	Dec 2018	-		2.150	0.000	2.150	-
Test and Evaluation	WR	COMOPTEVFOR : NORFOLK, VA	0.000	0.000		0.000		0.260	Dec 2018	-		0.260	0.000	0.260	-
Government T&E Support	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		1.000	Dec 2018	-		1.000	0.000	1.000	-
Subtotal			0.000	0.000		0.000		3.410		-		3.410	0.000	3.410	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	VARIOUS : WASHINGTON, DC	0.000	0.000		0.000		1.100	Feb 2019	-		1.100	0.000	1.100	-
Travel	WR	NAVSEA : WNY, DC	0.000	0.000		0.000		0.135	Dec 2018	-		0.135	0.000	0.135	-
Subtotal			0.000	0.000		0.000		1.235		-		1.235	0.000	1.235	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		16.717		-		16.717	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

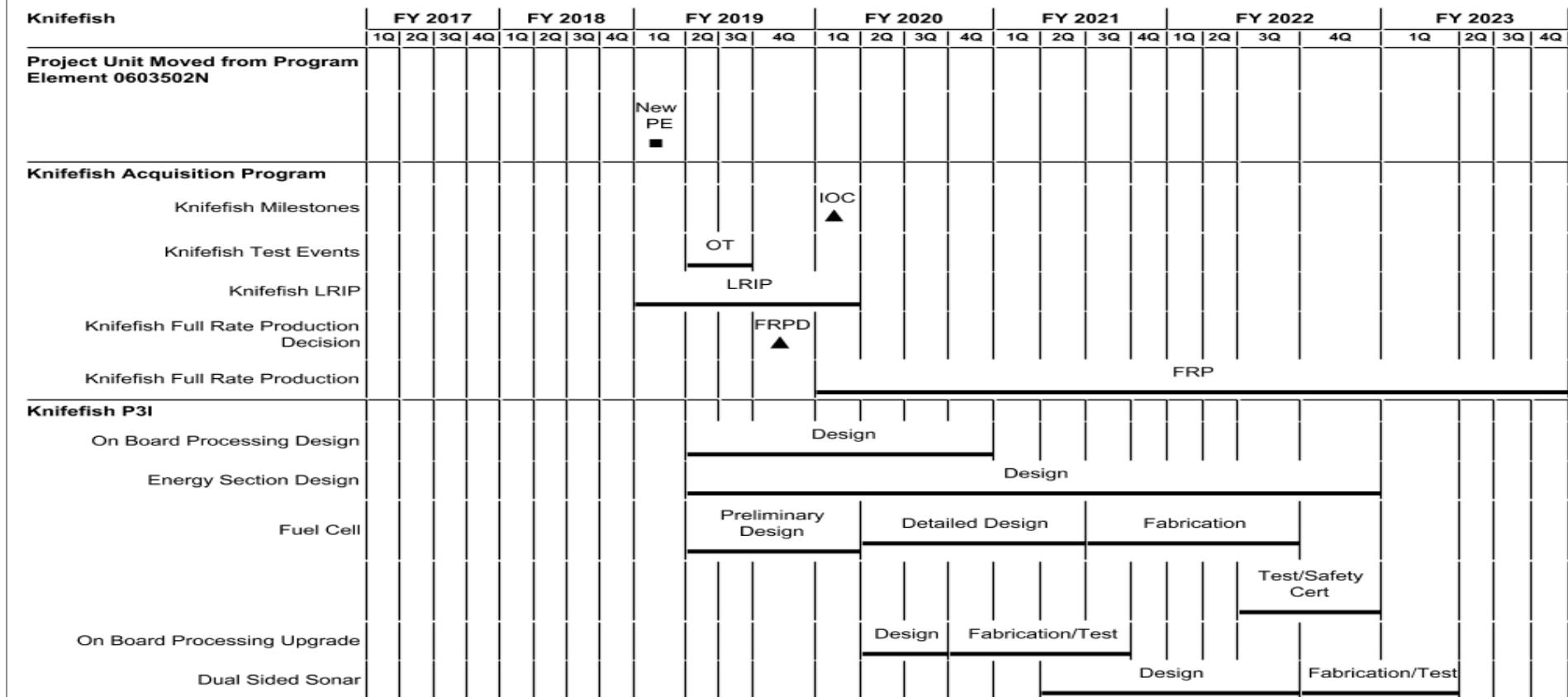
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604028N / Small and Medium
Unmanned Undersea Vehicles**Project (Number/Name)**

3123 / SMCM UUV



2019PB - 0604028N - 3123

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604028N / <i>Small and Medium Unmanned Undersea Vehicles</i>	Project (Number/Name) 3123 / <i>SMCM UUV</i>	Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Knifefish				
Project Unit Moved from Program Element 0603502N:	1	2019	1	2019
Knifefish Acquisition Program: Knifefish Milestones: IOC	1	2020	1	2020
Knifefish Acquisition Program: Knifefish Test Events: OT	2	2019	3	2019
Knifefish Acquisition Program: Knifefish LRIP: LRIP	1	2019	1	2020
Knifefish Acquisition Program: Knifefish Full Rate Production Decision: FRPD	4	2019	4	2019
Knifefish Acquisition Program: Knifefish Full Rate Production: FRP	1	2020	4	2023
Knifefish P3I: On Board Processing Design: Design	2	2019	4	2020
Knifefish P3I: Energy Section Design: Design	2	2019	4	2022
Knifefish P3I: Fuel Cell: Preliminary Design	2	2019	1	2020
Knifefish P3I: Fuel Cell: Detailed Design	2	2020	2	2021
Knifefish P3I: Fuel Cell: Fabrication	3	2021	3	2022
Knifefish P3I: Fuel Cell: Test/Safety Cert	3	2022	4	2022
Knifefish P3I: On Board Processing Upgrade: Design	2	2020	3	2020
Knifefish P3I: On Board Processing Upgrade: Fabrication/Test	4	2020	3	2021
Knifefish P3I: Dual Sided Sonar: Design	2	2021	3	2022
Knifefish P3I: Dual Sided Sonar: Fabrication/Test	4	2022	1	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604029N / Unmanned Undersea Vehicle Core Technologies								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	0.000	30.187	-	30.187	59.523	10.986	3.079	5.473	Continuing	Continuing	
3393: Adv Undersea Prototyping-Remote Command & Control	0.000	0.000	0.000	12.764	-	12.764	19.953	4.828	1.983	2.982	Continuing	Continuing	
3395: Adv Undersea Prototyping-Explosive Payloads	0.000	0.000	0.000	8.715	-	8.715	27.459	5.657	1.096	1.495	Continuing	Continuing	
3396: Adv Undersea Prototyping-Non-Lethal Payloads	0.000	0.000	0.000	8.708	-	8.708	12.111	0.501	0.000	0.996	Continuing	Continuing	

Note

FY 2018 and prior funding in Program Element (PE) 0604536N. Projects moved from PE 0604536N starting in FY 2019.

The FY 2019 funding request was reduced by \$4.835 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

In order to accelerate future capability and support steady growth of the fleet's Unmanned Undersea Vehicle (UUV) Family of Systems (FoS), UUV core technology efforts include development and test of UUV technologies and will advance the development of unmanned undersea vehicles systems by leveraging ONR and Industry UUV efforts for associated technologies. Payloads will be customized to meet Navy needs and demonstrate useful capability for the fleet. This Program Element supports developing experience, demonstrating launch, communications, command and control, navigation, endurance, recovery, payload feasibility, and mission planning and execution initially for XLUUVs and then other UUVs, as applicable. Energy prototyping will leverage existing independent research and development in energy-dense technology that could meet power requirements for future UUV missions that are limited by the amount of power currently available. Efforts include research, development, test, and evaluation of advanced development model energy solutions initially applicable to XLUUVs for increased energy endurance and efficiency to extend the reach of all unmanned undersea systems. The Common Control/Autonomy efforts will include risk reduction and developmental efforts of autonomy systems and architectures to work to develop common standards, interfaces, and systems to support cross-domain applications. The payloads efforts will include investigation, experimentation, demonstration, development and integration of lethal and non-lethal payloads, as applicable.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity		R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604029N / Unmanned Undersea Vehicle Core Technologies							
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO				
Previous President's Budget		0.000	0.000	0.000	-				
Current President's Budget		0.000	0.000	30.187	-				
Total Adjustments		0.000	0.000	30.187	-				
• Congressional General Reductions		-	-						
• Congressional Directed Reductions		-	-						
• Congressional Rescissions		-	-						
• Congressional Adds		-	-						
• Congressional Directed Transfers		-	-						
• Reprogrammings		-	-						
• SBIR/STTR Transfer		-	-						
• Rate/Misc Adjustments		0.000	0.000	30.187	-				
Change Summary Explanation									
Program Changes: FY19 +\$30,187K transfer to new Program Element from 0604536N.									
Technical: Not applicable. Schedule: Not applicable.									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0604029N / Unmanned Undersea Vehicle Core Technologies				3393 / Adv Undersea Prototyping-Remote Command & Control				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3393: Adv Undersea Prototyping-Remote Command & Control	0.000	0.000	0.000	12.764	-	12.764	19.953	4.828	1.983	2.982	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

FY 2018 and prior funding in Program Element (PE) 0604536N.

The FY 2019 funding request was reduced by \$1.879 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

Advanced Undersea energy efforts will leverage existing independent research and development in energy-dense technology that could meet power requirements for the Unmanned Undersea Vehicle (UUV) FoS missions, which are limited by the amount of power that they can carry. Efforts under this program element include research, development, test, and

evaluation of advanced energy solutions initially applicable to XLUUVs for increased energy endurance and efficiency to extend the reach of unmanned undersea systems. The Common Control/Autonomy portion of this project funds risk reduction and developmental efforts of autonomy systems and architectures to work to develop common standards, interfaces, and

systems to support cross-domain applications. This includes advanced development prototyping and demonstrations to accelerate the design and development of commonality and interoperability capabilities for the cross-domain (Surface and Sub-Surface, Aviation and Ground) requirements of the Navy. Coordinating with the Common Control System where

applicable, these efforts will demonstrate scalable, adaptable and interoperable warfighting capabilities across various unmanned systems. The advanced development emphasis will be to encourage innovation and enable rapid integration of UxS capabilities across domains while working to develop common standards, interfaces, and systems. These efforts will define, develop and demonstrate capability that advance new technology, hardware and software of Control Systems that could be used to operate multiple and dissimilar Naval UxSs. Supports Advanced Development and Prototyping of PE 0305205N: UAS Integration and Interoperability.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Product Development	0.000	0.000	10.534	0.000	10.534
Articles:	-	-	-	-	-
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0604536N.					
FY 2019 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies	Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Energy: Continue component design and begin system integration for the Advanced Development Model prototype. Conduct Critical Design Review (CDR). Increase in design and system integration efforts contribute to budget ramp up.						
Autonomy : Commence development of modeling and simulation. Work on standards and specifications initial implementation and modeling/simulation efforts & test bed development. Continue requirements development, focusing on vehicle management. Start initial low-level testing and continue design efforts for CCS.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0604536N. FY 2019 increase in funding is due to increased energy efforts, autonomy modeling and simulation, test bed development, and increased CCS efforts.						
Title: Support	Articles:	0.000	0.000	1.780	0.000	1.780
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0604536N.		-	-	-	-	-
FY 2019 Base Plans: Energy: Update program documentation as required and support efforts.						
Autonomy: Update documentation and continue work on development of common autonomy standards, interfaces, and systems; support modeling/simulation efforts and test bed development. Update CCS documentation and support testing and design efforts.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0604536N. FY 2019 increase in funding is due to increased support needs for energy, autonomy modeling and simulation, test bed development, and increased CCS efforts.						
Title: Management	Articles:	0.000	0.000	0.450	0.000	0.450
		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			Project (Number/Name)					
1319 / 4		PE 0604029N / Unmanned Undersea Vehicle Core Technologies			3393 / Adv Undersea Prototyping-Remote Command & Control					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0604536N.										
FY 2019 Base Plans: Energy: Provide guidance, project planning, financial and contracting support, and coordination between prototype developer, test support, engineering, and contractors.										
Autonomy: Provide guidance, project planning, financial and contracting support, and coordination for development of common autonomy standards, interfaces, and systems, and common control efforts.										
FY 2019 OCO Plans: N/A										
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0604536N. FY 2019 increase in funding is due to increased management needs for energy, autonomy modeling and simulation, test bed development, and increased CCS efforts.										
Accomplishments/Planned Programs Subtotals						0.000	0.000	12.764	0.000	12.764
C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete Total Cost
• RDTEN/0604536N/3393: Adv Undersea Prototyping-Remote Command & Control	1.486	2.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000 3.486
Remarks	Funding moved to new Program Element in FY2019									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604029N / <i>Unmanned Undersea Vehicle Core Technologies</i>	Project (Number/Name) 3393 / <i>Adv Undersea Prototyping-Remote Command & Control</i>
D. Acquisition Strategy <p>Design Advanced Energy components to reach Preliminary Design Review in FY18. Develop and build advanced energy prototype and integrate system when ready. Test advanced energy prototype starting in FY21. Develop requirements, standards, interfaces, and architecture for Autonomy and Common Control System (CCS) unmanned system software components to support common prototyping and experimentation. Design and develop CCS unmanned system software components for common cross domain prototyping and system integration with surrogate systems starting in FY22. Coordination with UxS platforms will eliminate redundant efforts, encourage innovation, and improve coordination of unmanned systems across multiple domains.</p> <p>Leveraging the available applicable portions of the Common Control System (CCS) capabilities and products, the effort will work to reduce risk with advanced development efforts across Naval operating domains. The advanced energy efforts will leverage resources and prototype expertise to encourage industry innovation and allow for rapid integration into unmanned systems. Coordinate with other UxS Programs and Systems on the development of UUV autonomy standards, architectures, and systems, defining and focusing autonomy efforts. Develop algorithms and models and simulations for testing autonomy that could be inserted into UUVs.</p>		
E. Performance Metrics <p>Demonstrate use of advanced UUV Energy technology in an Advanced Development Model prototype. Demonstrate CCS & autonomy software through surrogate systems.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies				Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Contract	SS/CPFF	ARL PSU : State College, PA	0.000	0.000		0.000		3.635	Dec 2018	-		3.635	Continuing	Continuing	Continuing
Common Control System (CCS) Cross-Domain Architecture Development	Various	Various : Various	0.000	0.000		0.000		3.100	Dec 2018	-		3.100	Continuing	Continuing	Continuing
Autonomy	Various	Various : Various	0.000	0.000		0.000		3.799	Dec 2018	-		3.799	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		10.534		-		10.534	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0604536N.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Engineering Support 1	SS/CPFF	Various : Various	0.000	0.000		0.000		0.794	Dec 2018	-		0.794	Continuing	Continuing	Continuing
Autonomy Support	Various	NAVSEA Activities : Washington, DC	0.000	0.000		0.000		0.506	Dec 2018	-		0.506	Continuing	Continuing	Continuing
Common Control System (CCS) Engineering Support	Various	Various : Various	0.000	0.000		0.000		0.480	Dec 2018	-		0.480	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.780		-		1.780	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0604536N.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype	Various	Various : Various	0.000	0.000		0.000		0.150	Jan 2019	-		0.150	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies						Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control			
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Autonomy	Various	NAVSEA Activities : Washington, DC	0.000	0.000		0.000		0.150	Jan 2019	-		0.150	Continuing	Continuing	Continuing
Common Control System (CCS)	Various	Various : Various	0.000	0.000		0.000		0.150	Jan 2019	-		0.150	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.450		-		0.450	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0604536N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		12.764		-		12.764	Continuing	Continuing	N/A
Remarks															

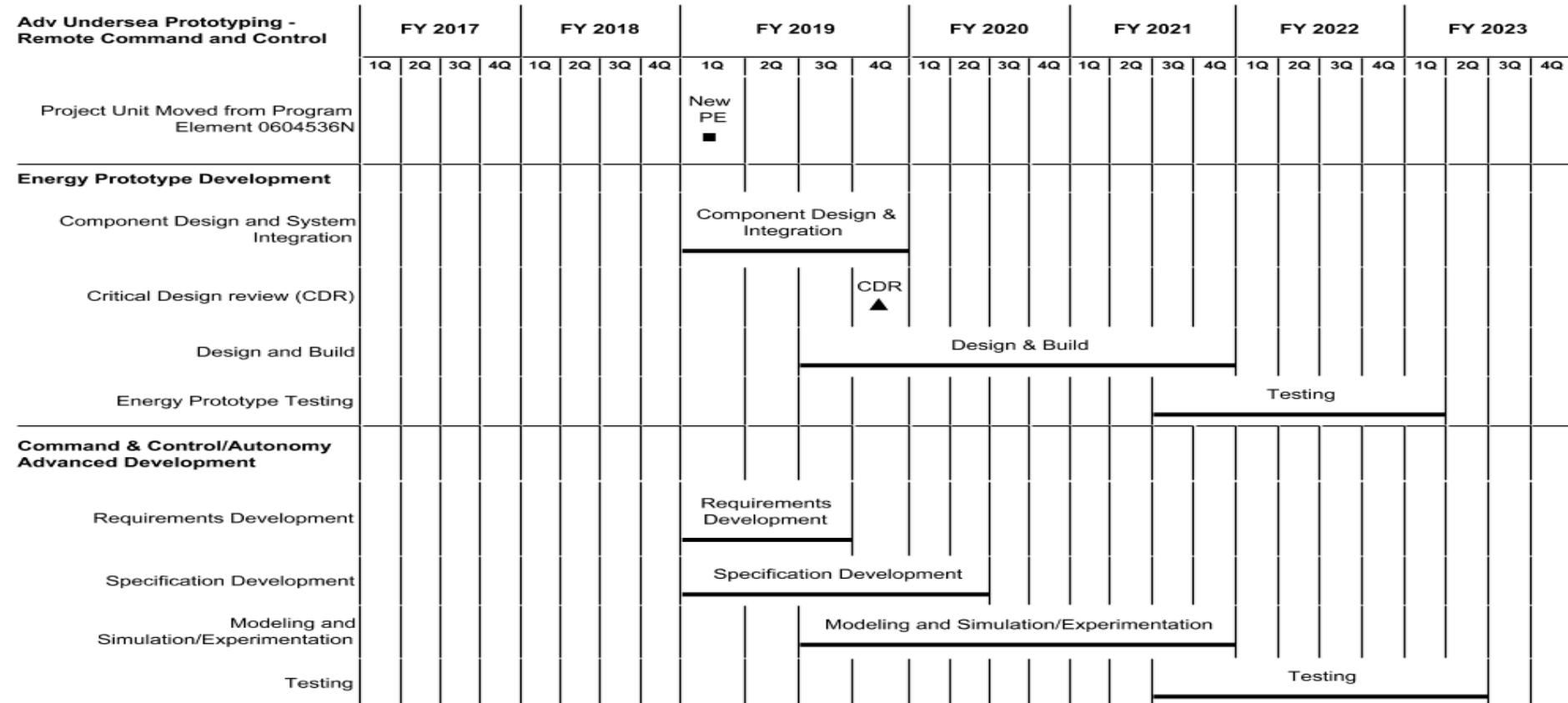
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604029N / Unmanned Undersea
Vehicle Core Technologies**Project (Number/Name)**3393 / Adv Undersea Prototyping-Remote
Command & Control

2019PB - 0604029N - 3393

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604029N / <i>Unmanned Undersea Vehicle Core Technologies</i>	Project (Number/Name) 3393 / <i>Adv Undersea Prototyping-Remote Command & Control</i>	Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Adv Undersea Prototyping - Remote Command and Control</i>				
Project Unit Moved from Program Element 0604536N: New PE	1	2019	1	2019
Energy Prototype Development: Component Design and System Integration: Component Design and System Integration	1	2019	4	2019
Energy Prototype Development: Critical Design review (CDR): Critical Design review (CDR)	4	2019	4	2019
Energy Prototype Development: Design and Build: Design and Build	3	2019	4	2021
Energy Prototype Development: Energy Prototype Testing: Testing	3	2021	1	2023
Command & Control/Autonomy Advanced Development: Requirements Development: Requirements Development	1	2019	3	2019
Command & Control/Autonomy Advanced Development: Specification Development: Specification Development	1	2019	2	2020
Command & Control/Autonomy Advanced Development: Modeling and Simulation/ Experimentation:	3	2019	4	2021
Command & Control/Autonomy Advanced Development: Testing: Testing	3	2021	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0604029N / Unmanned Undersea Vehicle Core Technologies				3395 / Adv Undersea Prototyping-Explosive Payloads				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3395: Adv Undersea Prototyping-Explosive Payloads	0.000	0.000	0.000	8.715	-	8.715	27.459	5.657	1.096	1.495	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

FY 2018 and prior funding in Program Element (PE) 0604536N.

The FY 2019 funding request was reduced by \$1.253 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

Advanced undersea prototyping of undersea explosive payloads initially from XL sized UUVs, and eventually from other UUVs in the UUV FOS. Leveraging the developments at ONR and other activities for undersea weapons, work to complete analysis of feasibility, policy, lethality, and performance of integrating undersea weapons systems initially on XLUUVs. The program will design new hardware, investigate and develop new interfaces/systems to increase lethality in both the undersea and surface targets. New C2 algorithms will be developed for advanced targeting. Once initially proven on XLUUVs, efforts will support integrating on applicable FOS UUVs, as applicable.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Explosive Payloads	0.000	0.000	8.715	0.000	8.715
Articles:	-	-	-	-	-
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0604536N.					
FY 2019 Base Plans: Continue development of XLUUV Undersea weapons payload systems. Order initial material in support of design. Continue XLUUV interface development.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 and prior funding in Program Element (PE) 0604536N. FY 2019 increase in funding supports material order and increased development efforts.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	8.715	0.000	8.715

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604029N / <i>Unmanned Undersea Vehicle Core Technologies</i>					Project (Number/Name) 3395 / <i>Adv Undersea Prototyping-Explosive Payloads</i>		
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTEN/0604536N/3395: <i>Adv Undersea Prototyping- Explosive Payloads</i>	1.220	2.014	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.234
Remarks Funding moved to new Program Element in FY2019											
D. Acquisition Strategy Leverage the knowledge base at the Naval Research and Development Enterprise to complete the feasibility studies that will then lead to the development of critical technology. The effort will heavily use the experience resident in the undersea weapons industrial base .											
E. Performance Metrics Successful launch of undersea weapons from an ORCA XLUUV.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies				Project (Number/Name) 3395 / Adv Undersea Prototyping-Explosive Payloads							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
XL Payload Interface Design & Fabrication	C/CPIF	TBD : TBD	0.000	0.000		0.000		5.035	Jan 2019	-		5.035	Continuing	Continuing	Continuing
COMMAND AND CONTROL	WR	TBD : TBD	0.000	0.000		0.000		1.609	Dec 2018	-		1.609	Continuing	Continuing	Continuing
Tech Support	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.991	Jan 2019	-		0.991	Continuing	Continuing	Continuing
Management	WR	TBD : TBD	0.000	0.000		0.000		0.300	Nov 2018	-		0.300	Continuing	Continuing	Continuing
Safety	WR	NSWC Indian Head : Indian Head, MD	0.000	0.000		0.000		0.780	Jan 2019	-		0.780	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		8.715		-		8.715	Continuing	Continuing	N/A
Remarks				Project moved to new Program Element in FY2019											
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		8.715		-		8.715	Continuing	Continuing	N/A
Remarks															

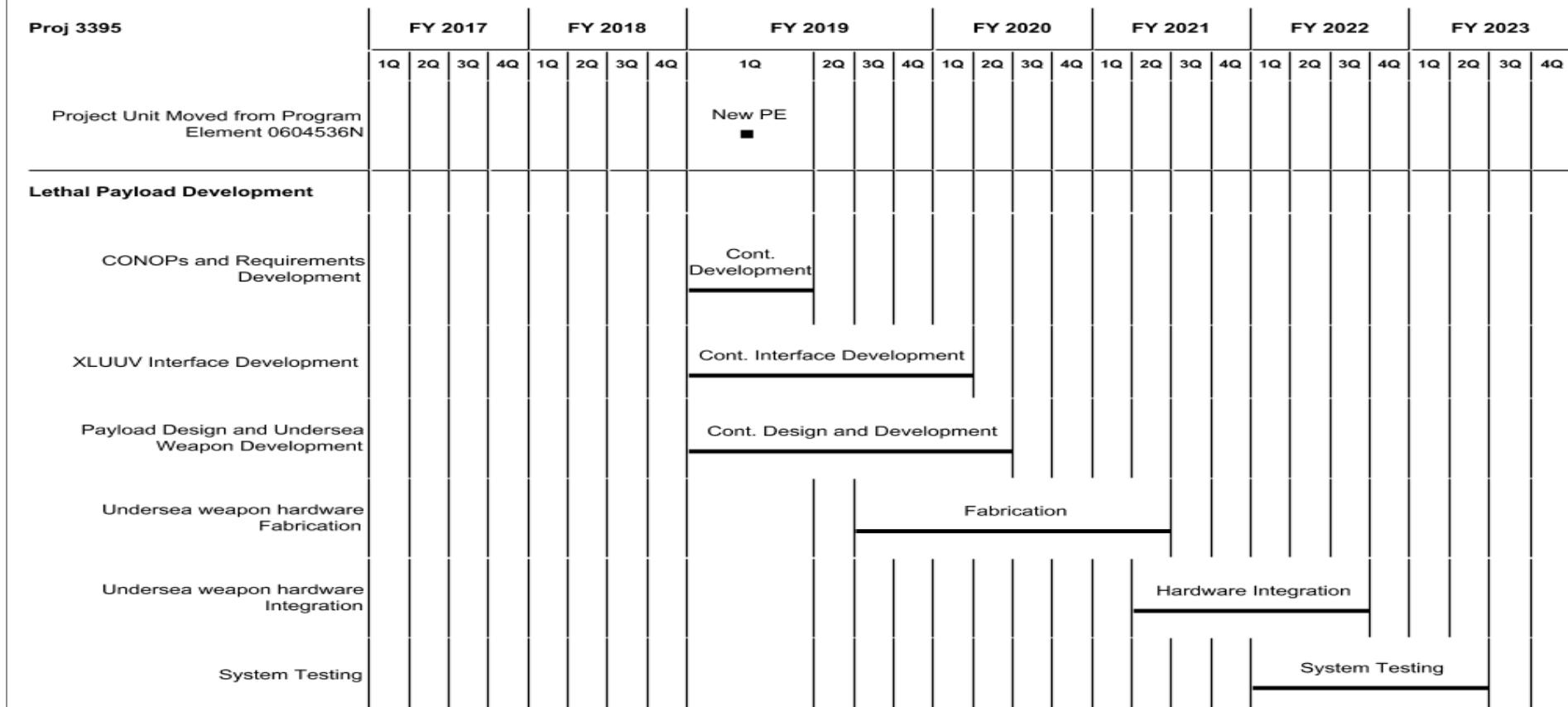
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604029N / Unmanned Undersea
Vehicle Core Technologies**Project (Number/Name)**3395 / Adv Undersea Prototyping-Explosive
Payloads

2019PB - 0604029N - 3395

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies	Project (Number/Name) 3395 / Adv Undersea Prototyping-Explosive Payloads

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3395				
Project Unit Moved from Program Element 0604536N: New PE	1	2019	1	2019
Lethal Payload Development: CONOPs and Requirements Development: CONOPs and Requirements	1	2019	1	2019
Lethal Payload Development: XLUUV Interface Development: Schedule Detail	1	2019	1	2020
Lethal Payload Development: Payload Design and Undersea Weapon Development: Phase A concept design- XL UUV Interface development	1	2019	2	2020
Lethal Payload Development: Undersea weapon hardware Fabrication: Fabrication	3	2019	2	2021
Lethal Payload Development: Undersea weapon hardware Integration:	2	2021	3	2022
Lethal Payload Development: System Testing:	1	2022	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies				Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3396: Adv Undersea Prototyping-Non-Lethal Payloads	0.000	0.000	0.000	8.708	-	8.708	12.111	0.501	0.000	0.996	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note
FY 2018 and prior funding in Program Element (PE) 0604536N.

The FY 2019 funding request was reduced by \$1.253 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification
Advanced undersea prototyping will experiment and demonstrate non-lethal payloads on ORCA XLUUVs for use initially on ORCA XLUUV and then on other FoS UUVs. This effort will investigate the possibilities of employing non-lethal payloads initially from the XLUUV to support ISR and strike missions. Non-kinetic payloads provide the warfare commander an option to stop aggressive behavior without escalating the conflict. Non-lethal payloads that will be considered include jamming, EO/IR dazzling, microwave, aerial assets, and other methods. Once initially proven on XLUUVs, efforts will support integrating on applicable FOS UUVs, as applicable.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Non Lethal Payloads FY 2018 Plans: FY 2018 funding in Program Element (PE) 0604536N. FY 2019 Base Plans: Conduct design efforts for the non-lethal payloads of the XLUUVs, develop the Interface Control Document (ICD). Commence planning for the fabrication effort. Order long lead material. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement:	0.000	0.000	8.708	0.000	8.708

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604029N / <i>Unmanned Undersea Vehicle Core Technologies</i>				Project (Number/Name) 3396 / <i>Adv Undersea Prototyping-Non-Lethal Payloads</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
FY 2018 funding in Program Element (PE) 0604536N. Increase in FY 2019 funding supports long lead time material and increased development efforts.											
Accomplishments/Planned Programs Subtotals						0.000	0.000	8.708	0.000	8.708	
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTEN/0604536N/3396: <i>Adv Undersea Prototyping- Non-Lethal Payloads</i>	0.500	1.017	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.517
Remarks											
Funding moved to new Program Element in FY2019											
D. Acquisition Strategy											
A technology study and market research will be completed in the first 12 months to examine the options available and the impact to the warfighter the different technology options bring. This will use a group of experts throughout the advanced undersea industry. Initial design efforts of a prototype system for the development of a non-kinetic payload will start in late FY18 for preliminary efforts with main efforts occurring after the study is completed. The payload will be initially integrated and demonstrated on the ORCA XLUUV.											
E. Performance Metrics											
Non-kinetic payload integrated onto an XLUUV. Detailed metrics are classified.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies						Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads				
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Design, Material, & Fabrication Efforts	WR	TBD : TBD	0.000	0.000		0.000		6.975	Nov 2018	-		6.975	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		0.000		6.975		-		6.975	Continuing	Continuing	N/A	
Remarks Project moved to new Program Element in FY2019																
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
DESIGN ANALYSIS	WR	NRL : WASHINGTON, D.C.	0.000	0.000		0.000		0.885	Nov 2018	-		0.885	Continuing	Continuing	Continuing	
Program Support	C/FFP	various : Arlington, VA	0.000	0.000		0.000		0.848	Nov 2018	-		0.848	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		0.000		1.733		-		1.733	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		0.000		8.708		-		8.708	Continuing	Continuing	N/A
Remarks Project moved to new Program Element in FY2019																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018																																																																																																																																																																																																																																																																																																																																																																						
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Proj 3396	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q																																																																																																																																																																																																																																																																																																																																																									
Project Moved from Program Element 0604536N	New PE ■																																																																																																																																																																																																																																																																																																																																																																																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604029N / Unmanned Undersea Vehicle Core Technologies	Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3396				
Project Moved from Program Element 0604536N: Schedule Detail	1	2019	1	2019
Non-Lethal Payload Development: Payload Design and Development:	1	2019	1	2020
Non-Lethal Payload Development: ICD Development:	1	2019	1	2020
Non-Lethal Payload Development: Fabrication:	4	2019	2	2021
Non-Lethal Payload Development: Integration and Testing:	1	2023	3	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604030N / Rapid Prototyping, Experimentation and Demonstrati								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	0.000	48.796	-	48.796	36.197	41.977	42.358	43.266	Continuing	Continuing	
0385: Rapid Prototype Development	0.000	0.000	0.000	48.796	-	48.796	36.197	41.977	42.358	43.266	Continuing	Continuing	

Note

Efforts in this Program Element (PE) and Project Unit (PU) 0385 were previously funded in PE 0603382N Advanced Combat Systems Tech; PU 0385 Rapid Prototype Development, and PU 0399 Unmanned Rapid Prototype Development. Funds are transferred to this PU effective FY2019.

A. Mission Description and Budget Item Justification

Department of Navy (DON) leadership has acknowledged that maintaining maritime superiority depends in part on our ability to accelerate the speed of warfighting and technological innovations in order to extend our advantage to offset our adversaries' growing capabilities. It is fundamental to the DON's efforts to improve our acquisition outcomes. This program element is aligned with, and in direct response to, calls for increased prototyping and experimentation in USD(AT&L)'s Better Buying Power 3.0, Secretary of the Navy's (SECNAV) Task Force Innovation direction, and the CNO direction to achieve High Velocity Learning at Every Level. These efforts will reinvigorate and increase the use of prototyping to rapidly field new warfighting capabilities, concepts and technologies, and engineering solutions.

The Rapid Prototype Development program funds a strategic focus on rapid prototyping of innovative combat system technologies and engineering innovations to explore Fleet-proposed capability concepts and needs, as well as foster advancements in naval warfighting capabilities. With an emphasis on rapidly prototyping mature technologies, the program is intended to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains. Concepts and enabling technologies include but are not limited to; directed energy weapons, hypersonics, unmanned systems, artificial intelligence, machine learning, and multi-domain operations.

Specific projects under this program will be selected and executed in accordance with the Department of the Navy (DoN) Accelerated Acquisition Process as described in SECNAVINST 5000.42. The Secretary of the Navy will notify Congress prior to initiation of a project under this program in accordance with the requirements established in Section 216 of the FY2017 National Defense Authorization Act.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity		R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604030N / Rapid Prototyping, Experimentation and Demonstrati							
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO				
Previous President's Budget		0.000	0.000	0.000	-				
Current President's Budget		0.000	0.000	48.796	-				
Total Adjustments		0.000	0.000	48.796	-				
• Congressional General Reductions		-	-						
• Congressional Directed Reductions		-	-						
• Congressional Rescissions		-	-						
• Congressional Adds		-	-						
• Congressional Directed Transfers		-	-						
• Reprogrammings		-	-						
• SBIR/STTR Transfer		-	-						
• Rate/Misc Adjustments		0.000	0.000	48.796	-				
Change Summary Explanation									
Technical: Not applicable.									
Schedule: Not applicable.									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604030N / Rapid Prototyping, Experimentation and Demonstrati				Project (Number/Name) 0385 / Rapid Prototype Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0385: <i>Rapid Prototype Development</i>	0.000	0.000	0.000	48.796	-	48.796	36.197	41.977	42.358	43.266	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Efforts in this Project Unit (PU) 0385 were previously funded in PE 0603382N Advanced Combat Systems Tech; PU 0385 Rapid Prototype Development and PU 0399 Unmanned Rapid Prototype Development. Funds are transferred to this PU effective FY2019.

A. Mission Description and Budget Item Justification

Department of Navy (DON) leadership has acknowledged that maintaining maritime superiority depends in part on our ability to accelerate the speed of warfighting and technological innovations in order to extend our advantage to offset our adversaries' growing capabilities. It is fundamental to the DON's efforts to improve our acquisition outcomes. This project is aligned with, and in direct response to, calls for increased prototyping and experimentation in USD(AT&L)'s Better Buying Power 3.0, Secretary of the Navy's (SECNAV) Task Force Innovation direction, and the CNO direction to achieve High Velocity Learning at Every Level. These efforts will reinvigorate and increase the use of prototyping to rapidly field new warfighting capabilities, concepts and technologies, and engineering solutions.

The Rapid Prototype Development project funds a strategic focus on rapid prototyping of innovative combat system technologies and engineering innovations to explore Fleet-proposed capability concepts and needs, as well as foster advancements in naval warfighting capabilities. With an emphasis on rapidly prototyping mature technologies, the project is intended to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains. Concepts and enabling technologies include but are not limited to; directed energy weapons, hypersonics, unmanned systems, artificial intelligence, machine learning, and multi-domain operations.

Specific projects under this project number will be selected and executed in accordance with the Department of the Navy (DoN) Accelerated Acquisition Process as described in SECNAVINST 5000.42. The Secretary of the Navy will notify Congress prior to initiation of a project under this project number in accordance with the requirements established in Section 216 of the FY2017 National Defense Authorization Act.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Rapid Prototype Development, Experimentation and Demonstration	0.000	0.000	48.796	0.000	48.796
Articles:	-	-	-	-	-

FY 2018 Plans:

Plans and associated resources in this project support the SURTASS-E Rapid Prototyping, Experimentation and Demonstration (RPED) effort which will provide a modular, flexible, and rapidly deployable mobile acoustic

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604030N / Rapid Prototyping, Experimentation and Demonstrati	Project (Number/Name) 0385 / Rapid Prototype Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
wide-area surveillance capability for installation aboard a vessel of opportunity (VOO). The project will deliver and demonstrate one system consisting of International Organization for Standardization containerized mission system ship set, installed on a VOO. Specific FY18 activities include: design and development of the SURTASS-E winch and handling system; procurement of long lead sub-systems for the command, control, communications, computers and intelligence (C4I) van; mission system hardware and software development and integration; VOO assessment, leasing and platform evaluation; VOO installation hardware; towed array towing hardware; acoustic processing development; and system level ship integration and performance assessment.						
Additionally, Project 0385 will support other FY2018 RPED initiatives, as designated by the Accelerated Acquisition Board of Directors (AABoD) in accordance with SECNAVINST 5000.42 to expedite the development, exploration and fielding of technology and engineering prototypes to provide advanced warfighting capabilities, new technologies and engineering innovations across all Naval warfighting domains.						
FY 2019 Base Plans: Complete SURTASS-E RDT&E activities to support initial fielding of capability in FY2019.						
Continue to fund RPED projects designated by the AABoD. Potential RPED projects may include, but are not limited to; directed energy weapons, hypersonics, unmanned systems, artificial intelligence, machine learning, and multi-domain operations.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY2018 and FY2019 in this project reflect increased investment in RPED projects designated by the AABoD and planned for execution in FY2019.						
Accomplishments/Planned Programs Subtotals		0.000	0.000	48.796	0.000	48.796
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604030N / <i>Rapid Prototyping, Experimentation and Demonstrati</i>	Project (Number/Name) 0385 / <i>Rapid Prototype Development</i>
D. Acquisition Strategy Projects identified for execution under this project number are non-acquisition programs. Each project will develop a project plan to support project execution. Project plans will include a project schedule and technical requirements and objectives to measure project performance. The selected technical solutions will be demonstrated in operationally relevant environments to assess their ability to meet warfighter requirements. Project deliverables include actual integrated hardware/software prototype systems, CONOPS, requirements, test reports, technical data, and associated doctrine, organization, training, leadership and education, and personnel aspects necessary to support decision making. These deliverables will be used to support project disposition decisions to include transition of technologies to acquisition, further refinement of the technology, or termination and reinvestment of remaining funds to other technologies that add military value.		
E. Performance Metrics Performance metrics are specific to each of the projects funded. All will include measures identified in the Statement of Objectives (SOO), including completions, successes, terminations, and iterative prototype cycle times reported against schedules and deliverables stated in the requirement documents.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604030N / Rapid Prototyping, Experimentation and Demonstrati				Project (Number/Name) 0385 / Rapid Prototype Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Common Support Modules Dev Integration	MIPR	PMS 420 : Washington, DC	0.000	0.000		0.000		0.900	Dec 2018	-		0.900	5.000	5.900	-
Towed Army Towing	C/CPFF	Lockheed Martin : Manassas, Va	0.000	0.000		0.000		3.700	Dec 2018	-		3.700	3.700	7.400	-
Prototype Dev, Experiemnt & Demonstration	Various	Various : Various	0.000	0.000		0.000		44.196	Mar 2019	-		44.196	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		48.796		-		48.796	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		48.796		-		48.796	Continuing	Continuing	N/A

Remarks

Support and Test and Evaluation costs are directly associated with the delivery of the primary product and included in the product development cost category for rapid prototype development, experimentation and demonstration cost categories.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0604030N / <i>Rapid Prototyping, Experimentation and Demonstrati</i>					0385 / <i>Rapid Prototype Development</i>											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 0385		Prototype Development, Experimentation and Demonstration																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604030N / <i>Rapid Prototyping, Experimentation and Demonstrati</i>	Project (Number/Name) 0385 / <i>Rapid Prototype Development</i>	
Schedule Details			
Events by Sub Project	Start	End	
Proj 0385	Quarter	Year	Quarter
Prototype Development, Experimentation and Demonstration	1	2019	4
			2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604031N / Large Unmanned Undersea Vehicles								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing	
2094: Unmanned Underwater Vehicle	0.000	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing	

Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Project realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

The Snakehead Large Displacement Unmanned Undersea Vehicle (LDUUV) is the Navy's Large Displacement UUV effort as part of the UUV Family of Systems (FoS). It is the number one Submarine-launched UUV priority due to the additional endurance and capability it will bring to the fleet in support of maintaining the Navy's undersea superiority. In order to accelerate future capability and support steady growth of the fleet's UUV FoS the Snakehead LDUUV program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability.

The Snakehead LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. The Snakehead LDUUV is a CNO/ASN(RDA) approved Accelerated Acquisition phased approach to build capabilities at a manageable level of risk in the Navy's class of Large Displacement Unmanned Undersea Vehicles. It currently consists of two phases of government-led development with significant industry involvement transitioning to industry production of the full vehicles.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	92.613	-	92.613
Total Adjustments	0.000	0.000	92.613	-	92.613
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	92.613	-	92.613

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604031N / <i>Large Unmanned Undersea Vehicles</i>
Change Summary Explanation Program Changes: FY19 +\$92,613K realigned from 0603502N, Project 2094. Technical: Not applicable. Schedule: Not applicable.	

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Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Project moved from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification

In order to accelerate future capability and support steady growth of the fleet's UUV Family of Systems (FoS) the Snakehead Large Displacement Unmanned Undersea Vehicle (LDUUV) program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability.

The Snakehead LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. The Snakehead LDUUV is a CNO/ASN(RDA) approved Accelerated Acquisition phased approach to build capabilities at a manageable level of risk in the Navy's class of Large Displacement Unmanned Undersea Vehicles. It consists of two phases of government-led development with significant industry involvement transitioning to industry production of the full vehicles.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
s:	0.000 -	0.000 -	81.695 -	0.000 -	81.695 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles	Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Provide engineering services for initial subsystem testing and risk reduction demos.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase in funding supports detailed design efforts.							
Title: LDUUV Support FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 Base Plans: Complete final design documentation and drawings, submarine Interface Control Documents, and subsystem test plans to assemble baseline technical data package for platform integration. Support fabrication and material efforts. Support platform integration efforts. Continue supportability analysis. Support Fleet with demonstration exercises with demo vehicles to develop Tactics, Techniques, and Procedures.	Articles: 0.000 - - - - - - -	0.000	0.000	8.930	0.000	8.930	-
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase due to additional support for detailed design efforts.							
Title: LDUUV Management FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 Base Plans:	Articles: 0.000 - - - - - - -	0.000	0.000	1.988	0.000	1.988	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018							
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles			Project (Number/Name) 2094 / Unmanned Underwater Vehicle								
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Provide program management support and travel for the LDUUV program. Program management plans include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program.														
FY 2019 OCO Plans: N/A														
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 increase supports management of detailed design efforts.														
Accomplishments/Planned Programs Subtotals							0.000	0.000	92.613	0.000	92.613			
C. Other Program Funding Summary (\$ in Millions)														
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	Cost To								
• RDTEN/0603502N/2094: <i>Unmanned Underwater Vehicle</i>	21.945	60.187	0.000	Base	OCO	Total	FY 2020	FY 2021	FY 2022	FY 2023	Complete Total Cost			
				-		0.000	0.000	0.000	0.000	0.000	146.992			
Remarks														
Funding moved to new Program Element in FY2019														
D. Acquisition Strategy														
Utilizing Navy requirements to insert incremental capability, the LDUUV program will design, build, and test risk-reducing UUVs in two phases followed by competitive award of a production contract.														
E. Performance Metrics														
LDUUV - Complete Critical Design Review (CDR) 1Q FY19														

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles				Project (Number/Name) 2094 / Unmanned Underwater Vehicle							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Vehicles, Hardware, & Design	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		12.090	Dec 2018	-		12.090	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	C/CPFF	Various : Various	0.000	0.000		0.000		46.258	Dec 2018	-		46.258	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	NSWC Carderock : West Bethesda, MD	0.000	0.000		0.000		3.254	Dec 2018	-		3.254	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	NSWC Panama City : Panama City, FL	0.000	0.000		0.000		0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	SS/CPFF	ARL PSU : Statte College, PA	0.000	0.000		0.000		5.997	Dec 2018	-		5.997	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	SSC Pacific : San Diego, CA	0.000	0.000		0.000		0.495	Jan 2019	-		0.495	Continuing	Continuing	Continuing
LDUUV Vehicles, Hardware, & Design	WR	NUWC Keyport : Keyport, WA	0.000	0.000		0.000		4.887	Jan 2019	-		4.887	Continuing	Continuing	Continuing
LDUUV Risk Reduction Soanr	SS/CPFF	ARL UT : Austin, TX	0.000	0.000		0.000		0.647	Feb 2019	-		0.647	Continuing	Continuing	Continuing
LDUUV Experimentation and Risk Reduction - Battery Certification	WR	NSWC Crane : Crane, IN	0.000	0.000		0.000		1.000	Dec 2018	-		1.000	Continuing	Continuing	Continuing
LDUUV Platform Integration	Various	Various : Various	0.000	0.000		0.000		6.867	Dec 2018	-		6.867	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		81.695		-		81.695	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles				Project (Number/Name) 2094 / Unmanned Underwater Vehicle							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Engineering Support	WR	NUWC Newport : Newport, RI	0.000	0.000		0.000		3.390	Dec 2018	-		3.390	Continuing	Continuing	Continuing
LDUUV Launch and Recovery Engineering Support	WR	NSWC Panama City : Panama City, FL	0.000	0.000		0.000		0.510	Feb 2019	-		0.510	Continuing	Continuing	Continuing
LDUUV Hydrodynamics and Propulsion Engineering Support	C/CPFF	Various : Various	0.000	0.000		0.000		1.088	Dec 2018	-		1.088	Continuing	Continuing	Continuing
LDUUV Command and Control Engineering Support	WR	NSWC Carderock : West Bethesda, MD	0.000	0.000		0.000		1.505	Dec 2018	-		1.505	Continuing	Continuing	Continuing
LDUUV Engineering	WR	SSC Pacific : San Diego, CA	0.000	0.000		0.000		0.468	Dec 2018	-		0.468	Continuing	Continuing	Continuing
Need Item Text	SS/CPFF	APL/JHU : Laurel, MD	0.000	0.000		0.000		0.469	Jan 2019	-		0.469	Continuing	Continuing	Continuing
Need Item Text	WR	NUWC Keyport : Keyport, WA	0.000	0.000		0.000		0.750	Dec 2018	-		0.750	Continuing	Continuing	Continuing
Need Item Text	SS/CPFF	Various : Various	0.000	0.000		0.000		0.750	Feb 2019	-		0.750	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		8.930		-		8.930	Continuing	Continuing	N/A

Remarks

FY 2018 and prior funding in Program Element (PE) 0603502N.

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Program Management	C/BA	NUWC Newport : Newport, RI	0.000	0.000		0.000		0.698	Dec 2018	-		0.698	Continuing	Continuing	Continuing
LDUUV Program Management	Various	Various : Various	0.000	0.000		0.000		1.115	Dec 2018	-		1.115	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles						Project (Number/Name) 2094 / Unmanned Underwater Vehicle			
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LDUUV Travel	Various	NAVSEA : Washington, DC	0.000	0.000		0.000		0.175	Dec 2018	-		0.175	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.988		-		1.988	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		92.613		-		92.613	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

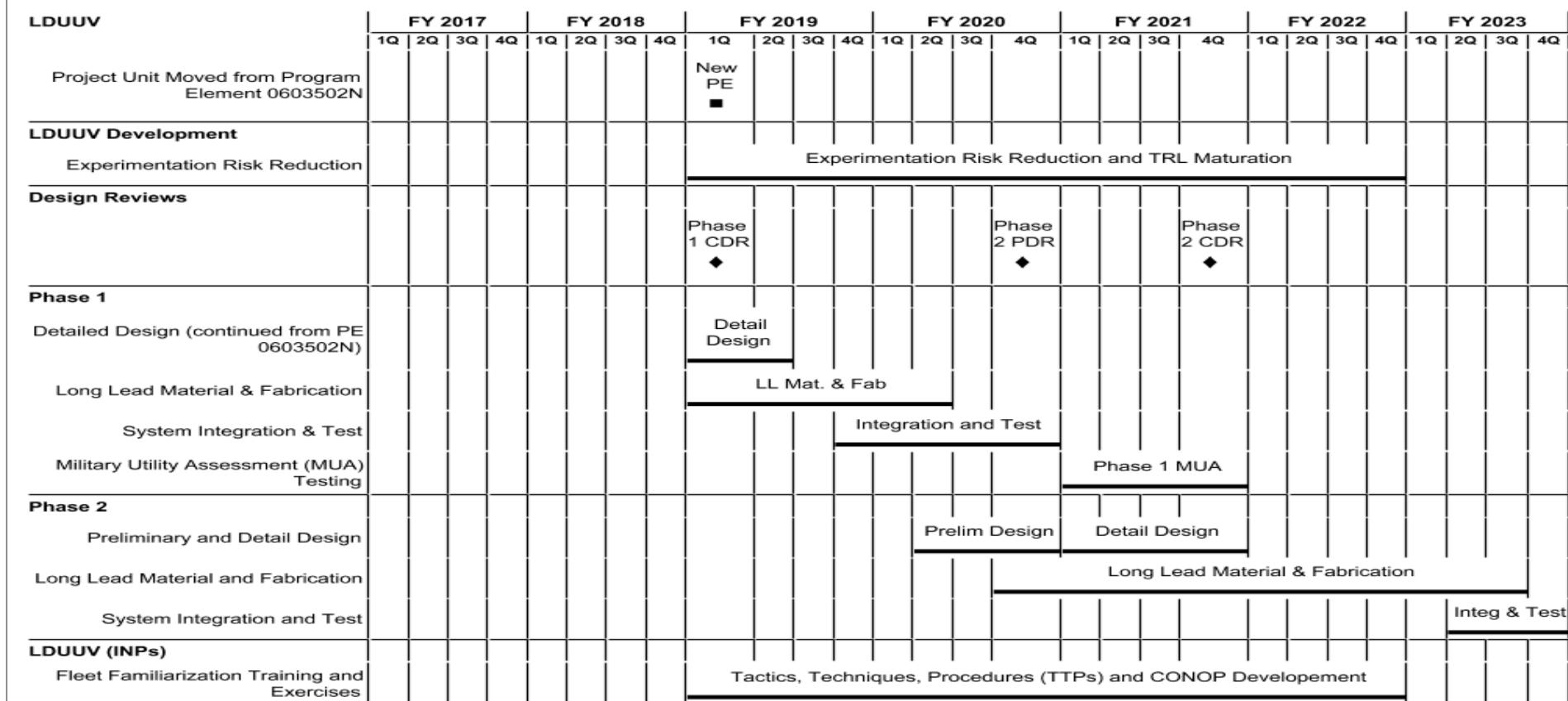
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604031N / Large Unmanned Undersea
Vehicles**Project (Number/Name)**

2094 / Unmanned Underwater Vehicle



2019PB - 0604031N - 2094

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604031N / Large Unmanned Undersea Vehicles	Project (Number/Name) 2094 / Unmanned Underwater Vehicle

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LDUUV				
Project Unit Moved from Program Element 0603502N:	1	2019	1	2019
LDUUV Development: Experimentation Risk Reduction:	1	2019	4	2022
Design Reviews: Phase 1 CDR	1	2019	1	2019
Design Reviews: Phase 2 PDR	4	2020	4	2020
Design Reviews: Phase 2 CDR	4	2021	4	2021
Phase 1: Detailed Design (continued from PE 0603502N):	1	2019	2	2019
Phase 1: Long Lead Material & Fabrication:	1	2019	2	2020
Phase 1: System Integration & Test:	4	2019	4	2020
Phase 1: Military Utility Assessment (MUA) Testing:	1	2021	4	2021
Phase 2: Preliminary and Detail Design: Preliminary Design	2	2020	4	2020
Phase 2: Preliminary and Detail Design:	1	2021	4	2021
Phase 2: Long Lead Material and Fabrication:	4	2020	3	2023
Phase 2: System Integration and Test:	2	2023	4	2023
LDUUV (INPs): Fleet Familiarization Training and Exercises:	1	2019	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	146.976	69.185	83.935	58.121	-	58.121	57.236	43.713	30.904	39.306	Continuing	Continuing	
2208: CVN 21	123.465	32.398	57.946	25.029	-	25.029	39.759	26.236	26.704	39.306	Continuing	Continuing	
4004: EMALS	23.511	36.787	25.989	33.092	-	33.092	17.477	17.477	4.200	0.000	0.000	158.533	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): 223													
A. Mission Description and Budget Item Justification													
The FY 2019 funding request was reduced by \$.094 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.													
This Navy program addresses unique technologies on Ford Class carriers. The program includes:													
- (2208) - Development of ship hull, mechanical, propulsion, electrical, aviation, and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, manpower requirements, survivability, and operational capabilities, and to meet the requirements of existing and pending regulations and statutes critical to the operation of existing and future aircraft carriers.													
- (4004) - Development of an advanced technology aircraft launch system in support of the CVN 78 Class design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability and reduced operator and maintainer workload.													
This Program Element (PE) and associated projects represent a continuation of efforts previously funded under PE 0603512N projects 2208 and 4004 in FY 2014 and earlier.													

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	70.528	83.935	84.195	-	84.195
Current President's Budget	69.185	83.935	58.121	-	58.121
Total Adjustments	-1.343	0.000	-26.074	-	-26.074
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.344	0.000			
• Program Adjustments	0.000	0.000	-25.394	-	-25.394
• Rate/Misc Adjustments	0.001	0.000	-0.680	-	-0.680
Change Summary Explanation					
FY19 - PROJ 2208 CVN 21: Removal of Full Ship Shock Trial (FSST) funding (-\$42.5M)					
FY19 - PROJ 4004 CVN 21: Addition of EMALS depot planning funding (+\$17.2M)					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 2208 / CVN 21						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
2208: CVN 21	123.465	32.398	57.946	25.029	-	25.029	39.759	26.236	26.704	39.306	Continuing	Continuing			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-					
Project MDAP/MAIS Code: 223															
A. Mission Description and Budget Item Justification															
<p>This project provides for the development of aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers, and the potential realization of subsystem design capabilities not currently feasible. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation, warfare systems, and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, manpower requirements, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers. This project also encompasses those tasks required to support CVN 78 procurement, including, but not limited to engineering support, programmatic and program support, logistics support, modeling and simulation, test and evaluation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment (IDE).</p>															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: CVN 78 Class Advanced Technology Design & Development Articles: Description: CVN 78 Class Advanced Technology Design & Development - Continue development and transition of technologies to support CVN 78 Class Key Performance Parameters (KPPs): maintain sortie generation rate, reductions in manpower, and further recovery of weight and stability service life margins. Continue design activities to integrate the new technologies, such as the new propulsion plant and Electromagnetic Aircraft Launch System into the ship. Complete shock qualification for components of all CVN 78 systems. FY 2018 Plans: Cyber-security: Continue developing CVN 78 cyber-security processes, requirements and solutions. Establish boundary defense for tactical, wire-free communication and video systems. Develop and maintain certification and accreditation packages for system support. Develop land-based test sites to conduct testing.											7.455	31.374	11.597	0.000	11.597

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0604112N / (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80	2208 / CVN 21				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
Component Shock: Complete CVN 78 Government-Furnished Equipment (GFE) component / system shock qualification requirements. This effort will allow necessary NAVSEA post-delivery shock hardening certification of CVN 78 prior to its operational deployment. The increase from FY2017 to FY2018 is due to the requirement for component shock qualification testing. Raytheon will be performing shock qualification testing of Dual Band Radar (DBR). NSWC Philadelphia will have an increased workload with significant shock test report review, test procedure review and test preparation assistance. SPAWAR is continuing its shock test efforts, with all testing to be completed by 4Q2018. Major systems to be component shock qualified are Navy Multiband Terminal (NMT), Digital Modular Radio (DMR), Tactical Variant Switch (TVS), Consolidated Afloat Network Enterprise Services (CANES) Video, Radio Communication System (RCS), Automated Digital Network System (ADNS), and Communications Data Link System (CDLS). There are also increasing requirements from Integrated Warfare Systems that are required for Ship's Self Defense System (SSDS) and Guided Missile Launching System (GMLS) for qualification.		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2019 Base Plans: Continue providing support to resolve issues identified during Post Shakedown Availability (PSA) on CVN 78 developmental systems. Cyber-security: Continue developing CVN 78 cyber-security processes, requirements and solutions. Establish boundary defense for tactical, wire-free communication and video systems. Develop and maintain certification and accreditation packages for system support. Develop land-based test sites to conduct testing. Continue to implement WIN10 upgrades, development of connect / disconnect procedures as well as continue to develop Security Technical Implementation Guides and Information Assurance Technical Authority Board in time for installation during the FY 2020 Planned Incremental Availability.						
Component Shock: Complete CVN 78 GFE component / system shock qualification requirements. This effort will allow necessary NAVSEA post-delivery shock hardening certification of CVN 78 prior to its operational deployment.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80	Project (Number/Name) 2208 I CVN 21				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Requirements in FY19 are for Raytheon to prepare and perform component shock testing of DBR elements, to include AN/SPY-4, AN/SPY-3, Receiver Exciter (REX), and processing rooms. NSWC Philadelphia will complete review of GFE shock test reports carried over from 4Q 2018 shock testing, provide guidance and approval for DBR test procedures, and review resulting DBR shock test reports.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to removal of Full Ship Shock Trials.						
Title: CVN 21 - Test & Evaluation (T&E)		Articles:	24.943	26.572	13.432	0.000
FY 2018 Plans: Continue Post Delivery Tests and Trials (PDT&T), Developmental Test Working Group (DTWG) and CVN 78 Integrated Test Team (CITT) efforts in support of Developmental Test / Integrated Test Phase 4 (DT/IT-4) completion. Perform oversight of FY 18 PDT&T and DT/IT-4 test event integration to address Developmental Test (DT) and Operational Test (OT) requirements. Major FY 18 PDT&T and DT/IT-4 test events include: (1) continued Combat Systems Shipboard Developmental Testing (CS SBDT) efforts; (2) continued cyber-security inspections and aircraft compatibility testing; (3) continued Special Performance Trials and Acoustic Trials and (4) completion of the development of the Sea-strike Sea-basing Aviation Model (SSAM) and data collection in support of model validation.		-	-	-	-	-
Continue PDT&T, DTWG, and CITT planning efforts in support of post-PSA DT/IT-5 integration testing and preparations for Initial Operational Test and Evaluation (IOT&E). Major post-PSA DT/IT-5 test events include: (1) obtaining post-PSA Platform (Afloat Site) (Interim) Authority to Operate (IA TO / ATO) and post-PSA flight deck certification; (2) continuing to conduct CS SBDT, Radar Cross Section and Infrared measurements, degaussing and de-perming, cyber-security inspections, and aircraft compatibility testing; and (3) continuing to conduct Combat System Ship Qualification Trial (CSSQT).						
FY 2019 Base Plans: Complete PSA and achieve Initial Operational Capability (IOC). Continue PDT&T, DTWG and CITT efforts in support of DT/IT-5 integration testing. Continue DT/IT-5. The test events scheduled for DT/IT-5 in FY 19 include continuing DBR shipboard engineering and developmental testing; platform-level combat systems						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity			R-1 Program Element (Number/Name)				Project (Number/Name)					
1319 / 4			PE 0604112N / (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				2208 / CVN 21					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total								
interoperability testing; platform-level C4I interoperability testing; CSSQT; structural test firings of Evolved Sea Sparrow Missile (ESSM) and Rolling Airframe Missile (RAM); Radar Cross Section (RCS) and Infrared (IR) measurements; degaussing and de-perming; cyber-security inspection; platform-level Hull, Mechanical and Electrical (HM&E) interoperability testing; platform-level aviation systems interoperability testing; and aircraft compatibility testing. Continue planning of Operational Testing, to include Operational Test Phase C1 (OT-C1) planned testing and begin detailed planning of scheduled OT-C2 test events.												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to removal of Full Ship Shock Trials.												
Accomplishments/Planned Programs Subtotals						32.398	57.946	25.029	0.000	25.029		
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• RDTEN / 0604567N: Project Units 3108, 3179, 4007	68.892	54.131	50.110	-	50.110	46.566	45.327	46.226	47.200	Continuing	Continuing	
• SCN / 2001: Carrier Replacement Program	2,626.567	4,441.772	1,598.181	-	1,598.181	2,146.535	3,239.606	2,910.491	3,378.355	10,602.689	50,900.224	
• SCN / 5300: Completion of Prior Year Shipbuilding Programs	0.000	20.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,394.860	
• OMN / 1B2B: CVN 78 Ford Class Training and Sustainment (12BJ0)	17.536	14.008	9.043	-	9.043	8.150	6.346	6.907	7.054	Continuing	Continuing	
• OPN / 5664: Surface Training Equipment	4.490	12.010	7.942	-	7.942	0.994	4.965	2.964	3.023	Continuing	Continuing	
• OMN / 1B1B: Mission and Other Ship Operations (11B30)	24.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	24.000	
Remarks												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80	Project (Number/Name) 2208 I CVN 21
D. Acquisition Strategy The CVN 78 is the first ship of the CVN 78 Class of aircraft carriers designed to replace USS ENTERPRISE and the ships of the NIMITZ Class. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, EMALS, advanced arresting gear (AAG) system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war fighting benefits will be realized: increased sortie generation rate, improved ship self-defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.		
E. Performance Metrics Successfully complete development of TEMP 1610, Rev C and route for signature. Successfully complete all PEO C4I Test Integration Facility (TIF) testing. Successfully execute Sortie Generation Rate Assessment (SGRA) 12 and SGRA 13. Successfully conduct and support feasibility and tradeoff studies and data packages on new and modified shipboard systems, technologies and proposed modification. Data packages shall include information to support program decisions to integrate these efforts into the whole ship design efforts. Successfully conduct IDC shock testing and reporting in order to finalize IDC R&D efforts. Successfully complete Advanced Weapons Elevator Shock and Electromagnetic Interference (EMI) Test qualifications. Successfully complete Plasma Arc Waste Destruction System (PAWDS) Land-Based Test. Successfully create and deliver 21 Decision Memorandums (DM) for Bents/Bays 1-21 on the 03 Level (Gallery Deck) with Layer 31 information. Successfully develop the baseline Technical Data Packages for 39 systems and mature packages in preparation for final GFI arrival. Successfully complete component shock testing.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 2208 I CVN 21							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Design & Development	C/CPAF	HII : VA	2.786	1.821	Nov 2016	2.825	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Advanced Design & Development	WR	NSWC CARDEROCK : MD	2.883	1.109	Oct 2016	0.000		0.500	Oct 2018	-		0.500	Continuing	Continuing	Continuing
Advanced Design & Development	WR	NAWC PATUXENT RIVER : MD	3.893	1.188	Oct 2016	0.000		0.250	Oct 2018	-		0.250	Continuing	Continuing	Continuing
Advanced Design & Development	WR	NSWC DAHLGREN : VA	4.252	0.515	Nov 2016	0.000		0.500	Oct 2018	-		0.500	Continuing	Continuing	Continuing
Advanced Design & Development	C/CPAF	RAYTHEON : VA	8.053	1.188	Dec 2016	10.100	Nov 2017	9.479	Oct 2018	-		9.479	Continuing	Continuing	Continuing
Advanced Design & Development	C/CPFF	NAVSEA SEAPORT : DC	13.164	1.386	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Advanced Design & Development	Various	MISCELLANEOUS : VARIOUS	3.640	0.248	Nov 2016	7.538	Nov 2017	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Advanced Design & Development	WR	NSWC PHILADELPHIA : PA	9.519	0.000		4.543	Nov 2017	0.618	Oct 2018	-		0.618	Continuing	Continuing	Continuing
Advanced Design & Development	WR	SPAWAR : CA	1.178	0.000		6.368	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Advanced Design & Development	WR	NSWC CORONA : CA	1.189	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Advanced Design & Development	WR	NAWC LAKEHURST : NJ	5.204	0.000		0.000		0.000		-		0.000	0.000	5.204	-
Subtotal		55.761	7.455		31.374		11.597		-		11.597	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	C/CPAF	HII : VA	4.356	0.834	Nov 2016	1.338	Nov 2017	0.165	Nov 2018	-		0.165	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	NAWC PATUXENT RIVER : MD	5.242	3.878	Oct 2016	1.576	Nov 2017	0.403	Nov 2018	-		0.403	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 2208 I CVN 21							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	WR	NSWC DAHlgren : VA	5.646	3.911	Oct 2016	5.034	Nov 2017	1.648	Nov 2018	-		1.648	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	NSWC CARDEROCK : MD	18.817	0.597	Oct 2016	6.048	Nov 2017	0.533	Nov 2018	-		0.533	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	SPAWAR : CA	4.020	0.696	Nov 2016	0.000		0.040	Nov 2018	-		0.040	Continuing	Continuing	Continuing
Development Test & Evaluation	C/CPAF	RAYTHEON : VA	6.158	1.716	Dec 2016	1.475	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	SSC ATLANTIC : SC	0.025	0.832	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Development Test & Evaluation	Various	MISCELLANEOUS : VARIOUS	1.315	0.346	Dec 2016	4.681	Dec 2017	1.366	Oct 2018	-		1.366	Continuing	Continuing	Continuing
Development Test & Evaluation	C/CPFF	NAVSEA SEAPORT : DC	0.616	0.000		1.100	Nov 2017	1.469	Nov 2018	-		1.469	Continuing	Continuing	Continuing
Development Test & Evaluation	C/BA	NSWC PORT HUENEME : CA	0.182	0.590	Dec 2016	0.000		0.799	Oct 2018	-		0.799	Continuing	Continuing	Continuing
Development Test & Evaluation	C/BA	NSWC CORONA : CA	0.182	1.436	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	NAWC LAKEHURST : NJ	2.821	0.000		1.680	Nov 2017	0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing
Development Test & Evaluation	WR	NSWC PHILADELPHIA : PA	0.434	0.000		1.200	Nov 2017	3.124	Nov 2018	-		3.124	Continuing	Continuing	Continuing
Operational Test & Evaluation	WR	COMOPTEVFOR : VA	5.044	10.107	Dec 2016	2.440	Nov 2017	2.904	Nov 2018	-		2.904	Continuing	Continuing	Continuing
Operational Test & Evaluation	WR	NAWC PATUXENT RIVER : MD	0.138	0.000		0.000		0.150	Oct 2018	-		0.150	Continuing	Continuing	Continuing
Development Test & Evaluation	C/CPFF	GRYPHON (SEI&T) : IN	0.000	0.000		0.000		0.631	Dec 2018	-		0.631	0.000	0.631	-
Development Test & Evaluation	C/CPFF	GENERAL ATOMICS : CA	10.708	0.000		0.000		0.000		-		0.000	0.000	10.708	-
Development Test & Evaluation	C/CPAF	BOEING : VA	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 2208 I CVN 21							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	C/CPFF	BECHTEL : PA	1.600	0.000		0.000		0.000		-		0.000	0.000	1.600	-
		Subtotal	67.704	24.943		26.572		13.432		-		13.432	Continuing	Continuing	N/A

Remarks
All Prior Years figures include the funding amounts from the FY 16 Congressional Add.

NSWC Philadelphia Cost Growth - Testing on CVN 78 is projected to increase in FY19 after the ship comes out of Post Shakedown Availability. The ship will be underway for nine (9) Independent Steaming Events and will conduct extensive testing and certification, particularly of Hull, Mechanical & Electrical (HM&E) systems. The additional funding to NSWC PD will fund HM&E Subject Matter Experts to evaluate, summarize and assess these test results against operational testing Measures of Effectiveness and Measures of Suitability. This will allow the program to identify areas of concern and to mitigate risk prior to entering operational testing.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	123.465	32.398		57.946		25.029		-		25.029	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

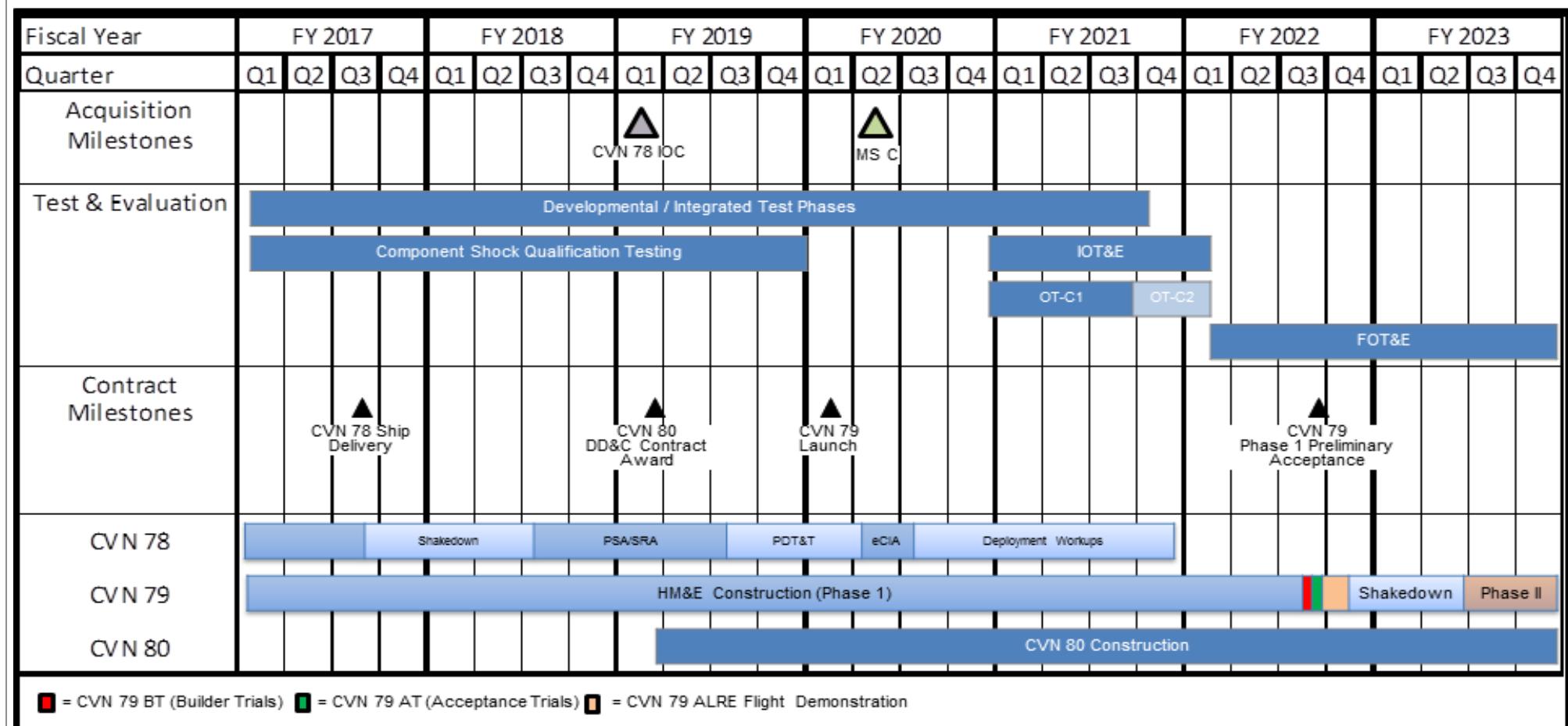
1319 / 4

R-1 Program Element (Number/Name)

PE 0604112N I (U) Gerald R Ford Cl Nuc
Aircraft Carrier CVN 78-80

Project (Number/Name)

2208 I CVN 21

Gerald R. Ford Class Carriers

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80	Project (Number/Name) 2208 I CVN 21		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 2208</i>				
Initial Operational Capability		1	2019	1
Milestone C		2	2020	2
Component Shock Qualification Testing		1	2017	4
Initial Operational Test & Evaluation		4	2020	1
CVN 80 Construction Contract Award		1	2019	1

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford CI Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 4004 I EMALS			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
4004: EMALS	23.511	36.787	25.989	33.092	-	33.092	17.477	17.477	4.200	0.000	0.000	158.533
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 223												
A. Mission Description and Budget Item Justification												
This project provides for the development of an advanced technology aircraft launch system in support of the CVN 78 design and construction schedule, as well as Engineering and Life Cycle System (E&LCS) design. The Electromagnetic Aircraft Launch System (EMALS) will be the aircraft catapult for CVN 78 Class ships. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
<i>Title:</i> EMALS <i>Description:</i> EMALS FY 2018 Plans: Continue EMALS Integrated Test & Evaluation (IT&E) land-based testing using deadloads and aircraft for the correction of deficiencies, critical reliability growth to achieve fleet operational requirements and to maintain test unit cycles above shipboard cycles. Conduct Environmental Qualification Testing (EQT) for Launch Control Subsystem (LCS) components deferred from System Development & Demonstration (SDD) and conduct EMALS component shock testing. Maintain EMALS shore-based test site to support: engineering investigations, software integration, deficiency resolution, component obsolescence regression test, and cyber security assessment/mitigation. Complete development of formal curriculum fleet operations and maintenance training. Continue the development of schoolhouse training systems for future Ford Class Aircraft Carrier personnel. Provide interim training for crews until formal schoolhouse training is established. FY 2019 Base Plans: Continue EMALS Integrated Test & Evaluation (IT&E) land-based testing using deadloads for the correction of deficiencies. Complete Environmental Qualification Testing (EQT) for Launch Control Subsystem (LCS) components deferred from System Development & Demonstration (SDD) and EMALS component shock testing. Maintain EMALS shore-based test site to support: engineering investigations, software integration, deficiency resolution, component obsolescence regression test, and cyber security assessment/mitigation. Complete the												
<i>Articles:</i>						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
						36.787	25.989	33.092	0.000	33.092	-	
						-	-	-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity			R-1 Program Element (Number/Name)				Project (Number/Name)					
1319 / 4			PE 0604112N / (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				4004 / EMALS					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
development of schoolhouse training systems for Ford Class Aircraft Carrier personnel. Provide interim training for crews until formal schoolhouse training is established. Begin the development of the required processes and procedures to plan for Depot Level activities. Initiate the planning and analysis necessary to standup EMALS Depot Level maintenance, overhaul and repair facility/facilities for EMALS components.												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 supports the development of EMALS depot level maintenance.												
Accomplishments/Planned Programs Subtotals							36.787	25.989	33.092	0.000	33.092	
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• RDTEN / 0604567N: <i>Project Units 3108, 3179, 4007</i>	68.892	54.131	50.110	-	50.110	46.566	45.327	46.226	47.200	Continuing	Continuing	
• SCN / 2001: <i>Carrier Replacement Program</i>	2,626.567	4,441.772	1,598.181	-	1,598.181	2,146.535	3,239.606	2,910.491	3,378.355	10,602.689	50,900.224	
• SCN / 5300: <i>Completion of Prior Year Shipbuilding Programs</i>	0.000	20.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,394.860	
• OMN / 1B2B: <i>CVN 78 Ford Class Training and Sustainment (12BJ0)</i>	17.536	14.008	9.043	-	9.043	8.150	6.346	6.907	7.054	Continuing	Continuing	
• OPN / 5664: <i>Surface Training Equipment</i>	4.490	12.010	7.942	-	7.942	0.994	4.965	2.964	3.023	Continuing	Continuing	
• OPN / 4213: <i>Aircraft Support Equipment</i>	81.428	63.695	65.459	-	65.459	95.441	72.816	73.371	83.861	Continuing	Continuing	
• OMN / 1B1B: <i>Mission and Other Ship Operations (11B30)</i>	21.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.000	
Remarks												
OPN 4213 includes a portion of line item funding for Electro Magnetic Aircraft Launch System (EMALS).												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N / (U)Gerald R Ford Cl Nuc <i>Aircraft Carrier CVN 78-80</i>	Project (Number/Name) 4004 / EMALS
D. Acquisition Strategy The CVN 78 is the first ship of the CVN 78 Class of aircraft carriers designed to replace USS ENTERPRISE and the ships of the NIMITZ Class. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system (EMALS), advanced arresting gear (AAG) system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war fighting benefits will be realized: increased sortie generation rate, improved ship self-defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.		
E. Performance Metrics Successfully complete System Functional Demonstration (SFD) testing. Successfully complete Environmental Qualification Testing (EQT). Successfully complete Shipset Controls Lab testing. Successfully complete Integrated Test and Evaluation (IT&E) including Environmental Qualification Testing (EQT), correction of deficiencies, reliability growth and shock testing.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 4004 I EMALS						

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract		
Primary HW Development - SDD	C/CPFF	General Atomics : San Diego, CA	0.000	22.746	Nov 2016	9.200	Nov 2017	0.000		-	0.000	0.000	31.946	31.945	
Training Development	C/FFP	Pro-Active Technologies, Inc : Oviedo, FL	0.000	5.200	Aug 2017	1.865	Jul 2018	0.000		-	0.000	0.000	7.065	7.065	
Primary HW Development	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	3.220	Nov 2016	2.852	Nov 2017	1.264	Nov 2018	-	1.264	0.000	7.336	-	
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	19.020	0.000		0.000		0.000		-	0.000	0.000	19.020	-	
Subtotal		19.020	31.166			13.917		1.264		-	1.264	0.000	65.367	N/A	

Remarks

FY17 Cost Categories updated to reflect actuals, current estimates and execution plans. FY18 and FY19 Cost Categories added to provide updated plans for Training Systems estimates.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract		
Government Engineering Support	WR	Various : Various	0.000	0.144	Feb 2017	0.115	Nov 2017	0.000		-	0.000	0.000	0.259	-	
Training Support	WR	NAWCAD TSD : Orlando, FL	0.000	0.296	Feb 2017	0.355	Nov 2017	0.295	Nov 2018	-	0.295	0.000	0.946	-	
Training Support	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	0.000		1.749	Nov 2017	0.695	Nov 2018	-	0.695	0.000	2.444	-	
Depot Logistics Development	TBD	General Atomics : San Diego, CA	0.000	0.000		0.000		15.936	Jan 2019	-	15.936	36.100	52.036	52.036	
Government Eng Support	WR	NAWCAD Lakehurst : Lakehurst, NJ	0.000	0.000		0.000		1.116	Nov 2018	-	1.116	3.054	4.170	-	
Subtotal		0.000	0.440			2.219		18.042		-	18.042	39.154	59.855	N/A	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80				Project (Number/Name) 4004 I EMALS								
Support (\$ in Millions)			FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total					
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost To Complete	Total Cost	Target Value of Contract		
Remarks Support cost elements added to reflect actuals for FY17 and to provide a more detailed breakout of FY18 and FY19 plans for government engineering and Training Support related to IT&E and Training Systems Development. FY19 plans added to support Depot Planning efforts.																
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Integrated Test & Evaluation	WR	NAWC Lakehurst : Lakehurst, NJ	0.000	3.232	Nov 2016	3.474	Nov 2017	1.699	Nov 2018	-		1.699	0.000	8.405	-	
Integrated Test & Evaluation	C/CPFF	General Atomics : San Diego, CA	0.000	0.000		3.934	Dec 2017	12.087	Nov 2018	-		12.087	0.000	16.021	16.021	
Developmental T&E	SS/CPFF	The Boeing Company : St. Louis, MO	0.000	1.949	Mar 2017	2.445	Jun 2018	0.000		-		0.000	0.000	4.394	4.394	
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	4.491	0.000		0.000		0.000		-		0.000	0.000	4.491	-	
Subtotal			4.491	5.181		9.853		13.786		-		13.786	0.000	33.311	N/A	
Remarks FY17 updated for actuals. FY18 was updated to reflect current estimates and new cost category to support deadload and aircraft testing for the correction of deficiencies Integrated Test & Evaluation (IT&E). The increase from FY18 to FY19 supports Integrated Test & Evaluation deadload testing for correction of deficiencies, Environmental Qualification Testing (EQT) for Launch Control Subsystem (LCS) components, EMALS component shock testing and the transition out of SDD to IT&E.																
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				23.511	36.787		25.989		33.092		-		33.092	39.154	158.533	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

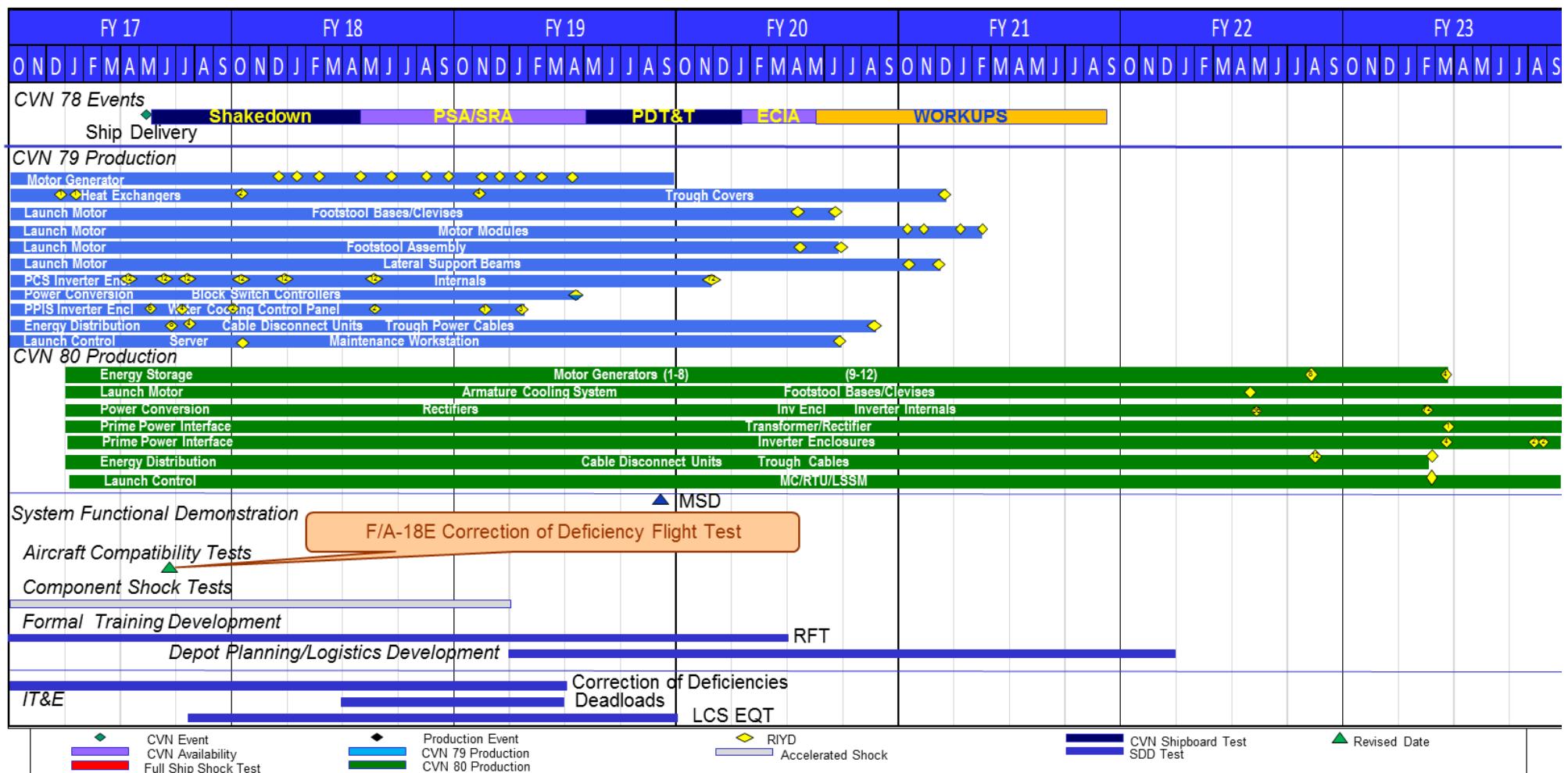
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0604112N / (U)Gerald R Ford CI Nuc
Aircraft Carrier CVN 78-80

Project (Number/Name)
4004 / EMALS



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604112N I (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80	Project (Number/Name) 4004 I EMALS		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 4004</i>				
EMALS SDD Complete		4	2018	4
EMALS Integrated Test & Evaluation (IT&E)		1	2017	1
EMALS Component Shock Test		1	2017	1
EMALS Launch Control Subsystem (LCS) Environmental Qualification Testing (EQT)		4	2017	4
EMALS Depot Level Planning		2	2019	1
				2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604122N I (U)Remote Minehunting System (RMS)								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	37.474	2.926	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.400	
0260: Remote Minehunting Systems	37.474	2.926	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.400	
Program MDAP/MAIS Code:													
Project MDAP/MAIS Code(s): 286													
A. Mission Description and Budget Item Justification													
The AN/WLD-1(V) 2 Remote Minehunting System (RMS) was a mine reconnaissance system designed for the detection, classification, identification, and localization of bottom and moored mines in shallow and deep water.													
As a result of the Department's Independent Review Team (IRT)the RMS program of record was cancelled.													
B. Program Change Summary (\$ in Millions)			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
Previous President's Budget			3.001	0.000	0.000	-	-						
Current President's Budget			2.926	0.000	0.000	-	-						
Total Adjustments			-0.075	0.000	0.000	-	-						
• Congressional General Reductions			-	-	-								
• Congressional Directed Reductions			-	-	-								
• Congressional Rescissions			-	-	-								
• Congressional Adds			-	-	-								
• Congressional Directed Transfers			-	-	-								
• Reprogrammings			-	-	-								
• SBIR/STTR Transfer			-0.075	0.000	-								
• Rate/Misc Adjustments			0.000	0.000	0.000	-	-						
Change Summary Explanation													
Program Adjustments:													
FY17 - \$75K SBIR assessment													
FY18 - N/A													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604122N I (U)Remote Minehunting System (RMS)				Project (Number/Name) 0260 I Remote Minehunting Systems			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0260: <i>Remote Minehunting Systems</i>	37.474	2.926	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	40.400
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 286												
A. Mission Description and Budget Item Justification												
The AN/WLD-1(V)2 Remote Minehunting System (RMS) was a mine reconnaissance system designed for the detection, classification, identification, and localization of bottom and moored mines in shallow and deep water.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
<i>Title:</i> Support <i>FY 2018 Plans:</i> N/A <i>FY 2019 Base Plans:</i> N/A <i>FY 2019 OCO Plans:</i> N/A <i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> No change from FY 2018 to FY 2019.							<i>Articles:</i> 2.000	0.000	0.000	0.000	0.000	
<i>Title:</i> Management <i>FY 2018 Plans:</i> N/A <i>FY 2019 Base Plans:</i> N/A <i>FY 2019 OCO Plans:</i>							<i>Articles:</i> -	0.926	0.000	0.000	0.000	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604122N I (U)Remote Minehunting System (RMS)	Project (Number/Name) 0260 I Remote Minehunting Systems	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: No change from FY 2018 to FY 2019.				
Accomplishments/Planned Programs Subtotals				2.926 0.000 0.000 0.000 0.000
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy An RMMV LRIP 1 Integration/Maintenance Contract was awarded in FY15 to support the integration and maintenance activities of LRIP 1 systems, integration with the LCS Freedom Variant, incorporate Ao improvements, and address obsolescence changes.				
E. Performance Metrics				
N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604122N I (U)Remote Minehunting System (RMS)				Project (Number/Name) 0260 I Remote Minehunting Systems							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Development & Integration	Various	LOCKHEED MARTIN : West Palm Beach, FL	24.338	0.000		0.000		0.000		-		0.000	0.000	24.338	-
SBIR Transition	Various	Various : Various	1.628	0.000		0.000		0.000		-		0.000	0.000	1.628	-
Hardware Development & Integration	C/FPIF	LOOKHEED MARTIN : West Palm Beach, FL	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
Subtotal			26.966	0.000		0.000		0.000		-		0.000	0.000	26.966	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering/ILS	WR	NSWC/PCD : Panama City, FL	5.205	1.750	Oct 2016	0.000		0.000		-		0.000	0.000	6.955	-
Engineering Support	WR	NUWC/NPT : Newport, RI	0.744	0.250	Nov 2016	0.000		0.000		-		0.000	0.000	0.994	-
Engineering Support	WR	PORTSMOUTH NSY : Portsmouth, NH	0.521	0.000		0.000		0.000		-		0.000	0.000	0.521	-
Subtotal			6.470	2.000		0.000		0.000		-		0.000	0.000	8.470	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LCS MCM MP Test Events	WR	NSWC/PCD : Panama City, FL	1.537	0.000		0.000		0.000		-		0.000	0.000	1.537	-
LCS MCM MP Test Events	SS/CPIF	LOCKHEED MARTIN : West Palm Beach, FL	0.763	0.000		0.000		0.000		-		0.000	0.000	0.763	-
Subtotal			2.300	0.000		0.000		0.000		-		0.000	0.000	2.300	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604122N I (U)Remote Minehunting System (RMS)				Project (Number/Name) 0260 I Remote Minehunting Systems							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Support	C/CPFF	TBD : TBD	1.647	0.926	Dec 2016	0.000		0.000		-		0.000	0.000	2.573	-
Travel	WR	NAVSEA : WNY, DC	0.091	0.000		0.000		0.000		-		0.000	0.000	0.091	-
Subtotal			1.738	0.926		0.000		0.000		-		0.000	0.000	2.664	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			37.474	2.926		0.000		0.000		-		0.000	0.000	40.400	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018													
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)															
1319 / 4								PE 0604122N / (U)Remote Minehunting System (RMS)								0260 / Remote Minehunting Systems															
Proj 0260				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022							
1Q				2Q				3Q				4Q				1Q				2Q				3Q				4Q			
Milestones																															
Product Development								RMS/LCS Integration																							
RMMV Contract Milestones								RMMV LRIP Integration/Maintenance Award																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604122N I (U)Remote Minehunting System (RMS)	Project (Number/Name) 0260 I Remote Minehunting Systems		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 0260</i>				
Product Development: RMS/LCS Integration		1	2017	4
RMMV Contract Milestones: RMMV LRIP Integration/Maintenance (Legacy Configuration) Award		1	2017	3

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604126N / Littoral Airborne MCM								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	0.000	17.622	-	17.622	20.348	17.041	17.399	17.761	Continuing	Continuing	
2131: Assault Breaching System	0.000	0.000	0.000	17.622	-	17.622	20.348	17.041	17.399	17.761	Continuing	Continuing	

Note

FY 2018 and prior funding for this program was funded in PE 0603502N, Project 2131.

A. Mission Description and Budget Item Justification

This program provides a combination of U.S. Navy systems to counter the threat to amphibious forces from obstacles and anti-landing/sea mines in the Beach Zone and Surf Zone (0-10 ft water). The Assault Breaching Systems (ABS) consist of a system of systems approach that includes the following programs: JABS - Joint Direct Attack Munition (JDAM) Assault Breaching System; CMS - Countermine System; COBRA - Coastal Battlefield Reconnaissance and Analysis; PNMS - Precision Navigation and Marking System; and C4I - Command, Control, Computers, Communications, and Intelligence. The Assault Breaching Systems enable the Navy-Marine Corps team to conduct Joint Forcible Entry Operations (JFEO), Ship-To-Objective Maneuver (STOM), and other combat operations to project power ashore.

The JDAM Assault Breaching System (JABS) is a currently fielded system that neutralizes surface mines and obstacles in the Beach Zone and Surf Zone. The ABS Tactical Decision Aid optimizes the Desired Points of Impact (DPI) for JDAM munitions to effectively neutralize mines and obstacles while minimizing the required number of munitions and friendly aircraft sorties. Continued testing is required to optimize the ABS Tactical Decision Aid database for the most common enemy mines and obstacles.

Coastal Battlefield Reconnaissance and Analysis (COBRA) is the ABS program to conduct ISR/T. This system provides Airborne Mine Countermeasures (AMCM) capability, and one system consists of two Airborne Payloads and one Post Mission Analysis Station. Block I is a multispectral sensor capable of daytime detection of surface-laid minefields and obstacles in the Beach Zone and adds on-board near real-time processing. Block II capability adds a 3D LIDAR (Light Detection and Ranging) sensor that enables nighttime detection of mines and obstacles in the Beach Zone and the Surf Zone (0-10 ft of water). Block II also adds on-board real-time processing of multispectral imagery data. COBRA consists of a modular payload architecture that can be integrated onto the MQ-8B Fire Scout or USN manned helicopters like the MH-60. COBRA will serve as the "detect" mission module in the Surf Zone and Beach Zone for the Littoral Combat Ship (LCS) Mine Warfare mission package.

Precision Navigation & Marking System (PNMS) provides navigational upgrades for the Landing Craft, Air Cushion (LCAC); Landing Craft, Utility (LCU); and Amphibious Assault Vehicle (AAV). A system of virtual lane marking improves the navigation ability of these three assault craft which enables them to navigate safely through the neutralized assault lanes provided by JABS and CMS. OPN funds the CRAFTALTS to upgrade the navigation systems. LCU Navigation Upgrade: Modernized the navigation system to enable safe transit through the breached lane. LCAC Autopilot Upgrade: An integrated improvement to the LCAC Service Life Extension Program (SLEP) navigation system for craft control that allows precise navigation and hovering within the breached lane. These software upgrades and backfits occur during scheduled LCAC SLEPs. AAV Navigation Upgrade : Modernize the navigation system to enable precise transit through the breached lane.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604126N / Littoral Airborne MCM			
Command, Control, Computers, Communications and Intelligence (C4I) system will tie all of the above systems together under an integrated ABS architecture that is compatible with the existing Mine Warfare architecture.					
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	17.622	-	17.622
Total Adjustments	0.000	0.000	17.622	-	17.622
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	17.622	-	17.622
Change Summary Explanation					
Technical: Not applicable.					
Schedule: Not applicable.					
FY 2019 funding for this program was realigned from PE 0603502N, Project 2131.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM				Project (Number/Name) 2131 / Assault Breaching System				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2131: Assault Breaching System	0.000	0.000	0.000	17.622	-	17.622	20.348	17.041	17.399	17.761	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This program provides a combination of U.S. Navy systems to counter the threat to amphibious forces from obstacles and anti-landing/sea mines in the Beach Zone and Surf Zone (0-10 ft water). The Assault Breaching Systems (ABS) consist of a system of systems approach that includes the following programs: JABS - Joint Direct Attack Munition (JDAM) Assault Breaching System; CMS - Countermine System; COBRA - Coastal Battlefield Reconnaissance and Analysis; PNMS - Precision Navigation and Marking System; and C4I - Command, Control, Computers, Communications, and Intelligence. The Assault Breaching Systems enable the Navy-Marine Corps team to conduct Joint Forcible Entry Operations (JFEO), Ship-To-Objective Maneuver (STOM), and other combat operations to project power ashore.

The JDAM Assault Breaching System (JABS) is a currently fielded system that neutralizes surface mines and obstacles in the Beach Zone and Surf Zone. The ABS Tactical Decision Aid optimizes the Desired Points of Impact (DPI) for JDAM munitions to effectively neutralize mines and obstacles while minimizing the required number of munitions and friendly aircraft sorties. Continued testing is required to optimize the ABS Tactical Decision Aid database for the most common enemy mines and obstacles.

Coastal Battlefield Reconnaissance and Analysis (COBRA) is the ABS program to conduct ISR/T. This system provides Airborne Mine Countermeasures (AMCM) capability, and one system consists of two Airborne Payloads and one Post Mission Analysis Station. Block I is a multispectral sensor capable of daytime detection of surface-laid minefields and obstacles in the Beach Zone and adds on-board near real-time processing. Block II capability adds a 3D LIDAR (Light Detection and Ranging) sensor that enables nighttime detection of mines and obstacles in the Beach Zone and the Surf Zone (0-10 ft of water). Block II also adds on-board real-time processing of multispectral imagery data. COBRA consists of a modular payload architecture that can be integrated onto the MQ-8B Fire Scout or USN manned helicopters like the MH-60. COBRA will serve as the "detect" mission module in the Surf Zone and Beach Zone for the Littoral Combat Ship (LCS) Mine Warfare mission package.

Precision Navigation & Marking System (PNMS) provides navigational upgrades for the Landing Craft, Air Cushion (LCAC); Landing Craft, Utility (LCU); and Amphibious Assault Vehicle (AAV). A system of virtual lane marking improves the navigation ability of these three assault craft which enables them to navigate safely through the neutralized assault lanes provided by JABS and CMS. OPN funds the CRAFTALTS to upgrade the navigation systems. LCU Navigation Upgrade: Modernized the navigation system to enable safe transit through the breached lane. LCAC Autopilot Upgrade: An integrated improvement to the LCAC Service Life Extension Program (SLEP) navigation system for craft control that allows precise navigation and hovering within the breached lane. These software upgrades and backfits occur during scheduled LCAC SLEPs. AAV Navigation Upgrade : Modernize the navigation system to enable precise transit through the breached lane.

Command, Control, Computers, Communications and Intelligence (C4I) system will tie all of the above systems together under an integrated ABS architecture that is compatible with the existing Mine Warfare architecture.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM	Project (Number/Name) 2131 / Assault Breaching System				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Product Development: FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 2131.	Articles: FY 2019 Base Plans: COBRA - Continue design and development of COBRA hardware and integration test planning of additional surf zone capabilities. JABS - Continue design and engineering of weapon effectiveness for beach and surf zones. FY 2019 OCO Plans: N/A	0.000	0.000	11.647	0.000	11.647
Title: Technical Support: FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 2131.	Articles: FY 2019 Base Plans: COBRA - Continue to provide management and shipping, contract and test/studies, C4I Data Fusion. Provide technical /acquisition support and documentation (ILS, training, data, drawings). FY 2019 OCO Plans: N/A	0.000	0.000	1.447	0.000	1.447
Title: Test and Evaluation: FY 2018 Plans:	Articles:	0.000	0.000	3.393	0.000	3.393

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy							Date: February 2018				
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM			Project (Number/Name) 2131 / Assault Breaching System						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
FY 2018 funding for this program was funded in PE 0603502N, Project 2131.											
FY 2019 Base Plans: COBRA - Continue advance surf zone component/capability design and test.											
JABS - Surf Zone (SZ) and Beach Zone (BZ) characterization testing.											
FY 2019 OCO Plans: N/A											
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding for this program was funded in PE 0603502N, Project 2131. FY 2019 funding increase supports increased technical support required to meet Block II requirements.											
Title: Management: FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 2131.		Articles: -			0.000	0.000	1.135	0.000	1.135		
FY 2019 Base Plans: Continue to manage Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion.											
FY 2019 OCO Plans: N/A											
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding for this program was funded in PE 0603502N, Project 2131. FY 2019 funding increase supports the COBRA program entering the second phase/block development cycle and to address the requirements captured in the COBRA Block II Capabilities Development Document (CDD).											
Accomplishments/Planned Programs Subtotals					0.000	0.000	17.622	0.000	17.622		
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/2624: SHALLOW WATER Mine CM SHIP	8.875	8.796	8.616	-	8.616	8.730	5.595	5.703	5.811	0.000	100.599

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM			Project (Number/Name) 2131 / Assault Breaching System				
C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023 Cost To Complete	Total Cost
Remarks										
D. Acquisition Strategy										
Countermine/Counter Obstacle (CM/CO)is JDAM Assault Breaching System (JABS) and ABS Tactical Decision Aid testing is ongoing.										
Intelligence/Surveillance/Reconnaissance/Targeting (ISR/T) - COBRA Block I achieved MS C in 3rd QTR FY 2009.										
Precision Navigation & Marking System (PNMS) - The navigation upgrades for the Landing Craft, Air Cushion (LCAC) and Landing Craft, Utility (LCU) are complete. AAV enhancements will be achieved through an ECP (PMA AAV (Marine Corps)) in 1st QTR FY 2019.										
E. Performance Metrics										
Successful COBRA integration, flight tests: Operational Assessment (OA) and Development Testing (DT) into the MQ-8B FIRESCOUT. COBRA achieved IOC in FY 2017.										
The above systems continue to meet or exceed their Key Performance Parameters.										

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM					Project (Number/Name) 2131 / Assault Breaching System					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Dev, COBRA	C/CPAF	Arete : Tucson, AZ	0.000	0.000		0.000		8.082	Dec 2018	-		8.082	Continuing	Continuing	Continuing
Systems Engineering, COBRA	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		1.200	Nov 2018	-		1.200	Continuing	Continuing	Continuing
JABS	WR	NSWC PC : NSWC IH	0.000	0.000		0.000		1.227	Nov 2018	-		1.227	Continuing	Continuing	Continuing
Training Dev, COBRA	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.859	Dec 2018	-		0.859	Continuing	Continuing	Continuing
ABS IPT/Test Assets/Proj Eng	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.279	Dec 2018	-		0.279	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		11.647		-		11.647	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding for this program was funded in PE 0603502N, Project 2131.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.942	Dec 2018	-		0.942	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NSWC PC : PANAMA CITY, FL	0.000	0.000		0.000		0.111	Nov 2018	-		0.111	Continuing	Continuing	Continuing
Configuration Management	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.111	Nov 2018	-		0.111	Continuing	Continuing	Continuing
Studies & Analysis	WR	NSWC IH : INDIAN HEAD, MD	0.000	0.000		0.000		0.283	Dec 2018	-		0.283	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.447		-		1.447	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding for this program was funded in PE 0603502N, Project 2131.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM				Project (Number/Name) 2131 / Assault Breaching System							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test & Evaluation	WR	NSWC, IH : INDIAN HEAD, MD	0.000	0.000		0.000		1.729	Nov 2018	-		1.729	Continuing	Continuing	Continuing
Operational Test & Evaluation	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	0.000	0.000		0.000		0.555	Dec 2018	-		0.555	Continuing	Continuing	Continuing
Development Test	WR	NSWC PC : Panama City, FL	0.000	0.000		0.000		1.109	Nov 2018	-		1.109	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		3.393		-		3.393	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding for this program was funded in PE 0603502N, Project 2131.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Engineering Support	C/CPFF	BAH, Northrop Grumman : DC, FL	0.000	0.000		0.000		0.138	Dec 2018	-		0.138	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC, IH : INDIAN HEAD, MD	0.000	0.000		0.000		0.501	Nov 2018	-		0.501	Continuing	Continuing	Continuing
Program Management Support	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	0.000	0.000		0.000		0.438	Oct 2018	-		0.438	Continuing	Continuing	Continuing
Travel	WR	NAVSEA : WNY, DC	0.000	0.000		0.000		0.058	Dec 2018	-		0.058	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.135		-		1.135	Continuing	Continuing	N/A
Remarks															
FY 2018 and prior funding for this program was funded in PE 0603502N, Project 2131.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		17.622		-		17.622	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy							Date: February 2018					
Appropriation/Budget Activity			R-1 Program Element (Number/Name)		Project (Number/Name)							
1319 / 4			PE 0604126N / Littoral Airborne MCM		2131 / Assault Breaching System							
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Remarks FY 2018 and prior funding for this program was funded in PE 0603502N, Project 2131.												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0604126N / Littoral Airborne MCM

Project (Number/Name)

2131 / Assault Breaching System

2019PB - 0604126N - 2131

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604126N / Littoral Airborne MCM	Project (Number/Name) 2131 / Assault Breaching System			
Schedule Details					
Events by Sub Project		Start	End		
COBRA		Quarter	Year	Quarter	Year
Schedule Detail		1	2019	1	2019
Acquisition Milestones: COBRA Block II: COBRA Block II EMD		1	2019	4	2021
Test & Evaluation: COBRA Block II: COBRA Block II Contractor Testing		1	2020	4	2021
Test & Evaluation: COBRA Block II: COBRA Block II Development Testing		1	2022	2	2023
Test & Evaluation: COBRA Block II: COBRA Block II Integration Testing		2	2023	4	2023
Deliveries: COBRA Block I: Block I		1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604127N / Surface Mine Countermeasures								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	0.000	18.154	-	18.154	20.635	17.560	14.260	14.530	Continuing	Continuing	
0530: Mine Hunt Systems	0.000	0.000	0.000	7.579	-	7.579	8.861	7.234	4.447	4.548	Continuing	Continuing	
1233: Surface MCM Mid-life Upgrade	0.000	0.000	0.000	0.000	-	0.000	1.011	1.031	1.054	1.075	Continuing	Continuing	
1235: Mine Warfare Planning and Analysis	0.000	0.000	0.000	10.575	-	10.575	10.763	9.295	8.759	8.907	Continuing	Continuing	

Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Projects realigned from PE 0603502N starting in FY 2019.

The FY 2019 funding request was reduced by \$1.192 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

This program element provides resources in support of development of mine countermeasure systems to provide minehunting, minesweeping, and neutralization to counter known and projected mine threats. The mine countermeasures systems provide mobile, quick reaction forces capable of land or sea-based minehunting and minesweeping operations worldwide. Resources are for developing and deploying advanced mine-hunting and minesweeping systems and the intelligence and oceanographic capabilities that will enable mine warfare superiority. Tactics and techniques used vary across a diversity of environments and a diversity of threats, including both asymmetric and emerging. Resources provide for systems and support of mine warfare systems, maritime systems, and expeditionary systems to allow for continuous operations of the Navy's warships and support vessels, other military vessels, and commercial vessels. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, reducing or eliminating post-mission analysis detect, classify, identify, decide time, improving neutralization time, improving network communications, automatic target recognition, and achieving in-stride detect-to-engage capability. The Surface Mine Countermeasures programs are in general platform independent and will provide detection, classification, localization, identification, neutralization, and influence clearance capabilities. Programs develop: (1) Unmanned minehunting capability for surface platforms; (2) the integration and improvement of new and existing systems (3) support for systems which detect, localize, classify, identify, and neutralize all mine types across MCM Avenger Class and other platforms.

1)The AN/AQS-20 is a mine hunting and identification system with sensors housed in an underwater towed body. The sensors are designated for the detection, classification and localization of bottom, close-tethered, and volume targets, and also for the identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package or can be deployed from other Vessels of Opportunity (VOO). The MCM USV is the tow platform for the AN/AQS-20.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity		R-1 Program Element (Number/Name)							
1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		PE 0604127N / <i>Surface Mine Countermeasures</i>							
2) AN/SQQ-32(V)4 High-Frequency, Wide Band (HFWB) is a technology upgrade to the AN/SQQ-32 Towed Body which will incorporate HFWB technology into the detection sonar to address performance deficiencies against new mine threats in the littorals. This upgrade will be installed on MCM-1 Class ships with the AN/SQQ-32(V)3 and will develop new transducer modules, fiber optic cable and modify topside processing and display software.									
3) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander. 3) Develop and implement Mine Countermeasures Commander's Estimate of the Situation (MCM CES).									
4) AN/SLQ-60 Mine Neutralization System (MNS) Seafox on the MCM Class ships. MNS is the replacement to the existing AN/SLQ-48 Mine Neutralization System.									
5) SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.									
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO				
Previous President's Budget		0.000	0.000	0.000	-				
Current President's Budget		0.000	0.000	18.154	-				
Total Adjustments		0.000	0.000	18.154	-				
• Congressional General Reductions		-	-						
• Congressional Directed Reductions		-	-						
• Congressional Rescissions		-	-						
• Congressional Adds		-	-						
• Congressional Directed Transfers		-	-						
• Reprogrammings		-	-						
• SBIR/STTR Transfer		-	-						
• Rate/Misc Adjustments		0.000	0.000	18.154	-				
					18.154				
Change Summary Explanation									
Program Changes:									
FY19 +\$18,154K realigned from PE 0603502N in FY 2019.									
Technical: Not applicable.									
Schedule: Not applicable.									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures				Project (Number/Name) 0530 / Mine Hunt Systems			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0530: Mine Hunt Systems	0.000	0.000	0.000	7.579	-	7.579	8.861	7.234	4.447	4.548	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2018 and prior funding in Program Element (PE) 0603502N. Projects moved from PE 0603502N starting in FY 2019.

The FY 2019 funding request was reduced by \$1.192 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

This project contains resources for systems, subsystems, and sensors integrated for use with the new program MCM Unmanned Surface Vehicle (MCM USV) for mine detection, classification, localization, and identification in support of mine neutralization, and influence clearance capabilities. Research, development, test, and evaluation efforts are for increasing capability by decreasing time required to conduct Mine Countermeasures (MCM) operations, ensuring low risk to naval and commercial vessels, and removing the man from the minefield. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, and reducing post-mission analysis for detection, classification, and identification.

The AN/AQS-20 is a mine hunting and identification system with sensors housed in an underwater towed body. The sensors are designated for the detection, classification and localization of bottom, close-tethered, and volume targets, and also for the identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package or can be deployed from other Vessels of Opportunity (VOO). The MCM USV is the tow platform for the AN/AQS-20. The AN/AQS-20 Block 1 (the AQS-20A) is undergoing a Pre-Planned Product Improvement (P3I) program to upgrade the Forward Looking Sonar (FLS) and Side-Looking Sonars (SLS) to improve Probability of Classifying a Mine-like object as a Mine, reduce False Classification, and improve Depth Localization performance to meet Block 2 (the AQS-20C) performance. The Forward Looking Sonar is being replaced with a new High Frequency Wideband Forward Looking Sonar (WBFLS) design. The SLS is being replaced with a new Multifunction SLS with Synthetic Aperture Sonar (SAS) capability, as well as, improved signal processing and Signal to Noise Ratio. The Block 1 P3I program began in FY 2012 and completed in FY 2017. Award and management for Block 2 production units began in FY 2014 (the AQS-20C). Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts continue beyond FY2023.

In FY 2018, the AN/AQS-20 Block 2 program (AQS-20C) is scheduled to conduct Developmental Testing (originally scheduled to start at end of FY17), initiate MCM USV integration, and initiation of MCM improvements for post mission analysis tools in support of Net-centric Sensor Analysis for Mine Warfare (NSAM) integration for the Fleet Operators. The net effect of these tools combined with the more powerful AN/AQS-20 Block 2 sensors will be improved classification of mines, more accurate vertical localization, reduced false calls, and improved area clearance rate sustained. Improvements also include the collection and ingestion of in-situ environmental data used for mission planning to configure the sensor which optimizes sensor performance during missions. Development of these tools begins in FY 2018 and will continue through FY 2021.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0604127N / Surface Mine Countermeasures	0530 / Mine Hunt Systems				
In FY 2019, the AN/AQS-20 Block 2 program will support the MCM USV User Operational Evaluation System (UOES), MCM USV Development Testing, and workups for the LCS MP Testing. NSAM initial integration efforts will continue. SAS acoustic mine recognition development will continue to support the potential for automated in-situ mine identification. Also efforts will include defining and developing necessary improvements for AN/AQS-20 Block 2 integration with the MCM USV.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: AN/AQS-20 Product Development	Articles:	0.000	0.000	3.000	0.000	3.000
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.		-	-	-	-	-
FY 2019 Base Plans: - Continue SAS Acoustic mine recognition development. - Continue SAS Acoustic mine recognition ECP. - Continue algorithm development for AN/AQS-20 Block 2 PMA Improvements including NSAM integration. - Continue AN/AQS-20 Block 2 improvements in support of MCM USV integration. - Correct deficiencies identified during testing.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 slight decrease due to completion of PMA Software efforts.						
Title: AN/AQS-20 Support	Articles:	0.000	0.000	0.900	0.000	0.900
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.		-	-	-	-	-
FY 2019 Base Plans: - Provide ongoing technical and management support to AN/AQS-20. - Continue to conduct test minefield maintenance. - Continue AN/AQS-20 Block 2 Mission Planning and Post Mission Analysis Concept of Employment development.						
FY 2019 OCO Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures	Project (Number/Name) 0530 / Mine Hunt Systems				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. No significant change from FY 2018 to FY 2019.						
Title: AN/AQS-20 Test and Evaluation	Articles:	0.000	0.000	3.179	0.000	3.179
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.		-	-	-	-	-
FY 2019 Base Plans: - Continue SAS Acoustic recognition Testing. - Update Test and Evaluation Master Plan. - Support MCM USV User Operational Evaluation System.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 funding in Program Element (PE) 0603502N. FY 2019 decrease due to completion of Developmental Testing (DT) in FY 2018.						
Title: AN/AQS-20 Management Services	Articles:	0.000	0.000	0.500	0.000	0.500
FY 2018 Plans: FY 2018 funding in Program Element (PE) 0603502N.		-	-	-	-	-
FY 2019 Base Plans: - Provide planning and management for the AN/AQS-20 program. - Begin update of acquisition documentation in support of Full Rate Production (FRP) Decision Review. - Continue to provide Program Office travel support.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018								
Appropriation/Budget Activity			R-1 Program Element (Number/Name)				Project (Number/Name)											
1319 / 4			PE 0604127N / Surface Mine Countermeasures				0530 / Mine Hunt Systems											
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
FY 2018 funding in Program Element (PE) 0603502N. No significant change from FY 2018 to FY 2019.																		
Accomplishments/Planned Programs Subtotals										0.000	0.000	7.579	0.000	7.579				
C. Other Program Funding Summary (\$ in Millions)																		
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost							
• OPN/1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,501.531	2,771.262							
• RDTEN/0603502N/0530: Mine Hunt Systems	9.469	9.761	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	299.669							
Remarks																		
OPN/1601 funding line accounts for several programs, of which the AN/AQS-20 program is only a portion.																		
D. Acquisition Strategy																		
AN/AQS-20 LRIP procurement continued following Block 2 (AQS-20C units) competitive contract award in FY 2014. Continue to meet MCM MP requirements to support production of Block 2 units.																		
E. Performance Metrics																		
AN/AQS-20 - Successfully complete Block 2 DT in FY 2018.																		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures				Project (Number/Name) 0530 / Mine Hunt Systems							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 P3I	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		1.100	Nov 2018	-		1.100	Continuing	Continuing	Continuing
AN/AQS-20 P3I	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		0.000		0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
AN/AQS-20 Block 2 PMA	WR	NSWC, PC : Panama City FL	0.000	0.000		0.000		0.800	Oct 2018	-		0.800	Continuing	Continuing	Continuing
AN/AQS-20 Block 2 PMA	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		0.000		0.850	Nov 2018	-		0.850	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		3.000		-		3.000	Continuing	Continuing	N/A

Remarks
FY 2018 and prior funding in Program Element (PE) 0603502N.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Engineering Services	WR	NSWC, PC : Panama City, FL	0.000	0.000		0.000		0.135	Oct 2018	-		0.135	Continuing	Continuing	Continuing
AN/AQS-20 Engineering Services	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing
AN/AQS-20 ILS Function	WR	NSWC, PC : Panama City FL	0.000	0.000		0.000		0.565	Nov 2018	-		0.565	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.900		-		0.900	Continuing	Continuing	N/A

Remarks
FY 2018 and prior funding in Program Element (PE) 0603502N.

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 T&E Functions	WR	COTF : Norfolk, VA	0.000	0.000		0.000		0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures			
Test and Evaluation (\$ in Millions)												FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 T&E Functions	WR	NSWC, PC : Panama City FL	0.000	0.000		0.000		2.479	Oct 2018	-		2.479	Continuing	Continuing	Continuing
AN/AQS-20 T&E Functions	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.500	Nov 2018	-		0.500	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		3.179		-		3.179	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N. COTF - Naval Command Operational Test and Evaluation Force															
Management Services (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Management Services	TBD	Various : Various	0.000	0.000		0.000		0.470	Dec 2018	-		0.470	Continuing	Continuing	Continuing
AN/AQS-20 Travel	TBD	Various : Various	0.000	0.000		0.000		0.030	Mar 2019	-		0.030	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.500		-		0.500	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		7.579		-		7.579	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

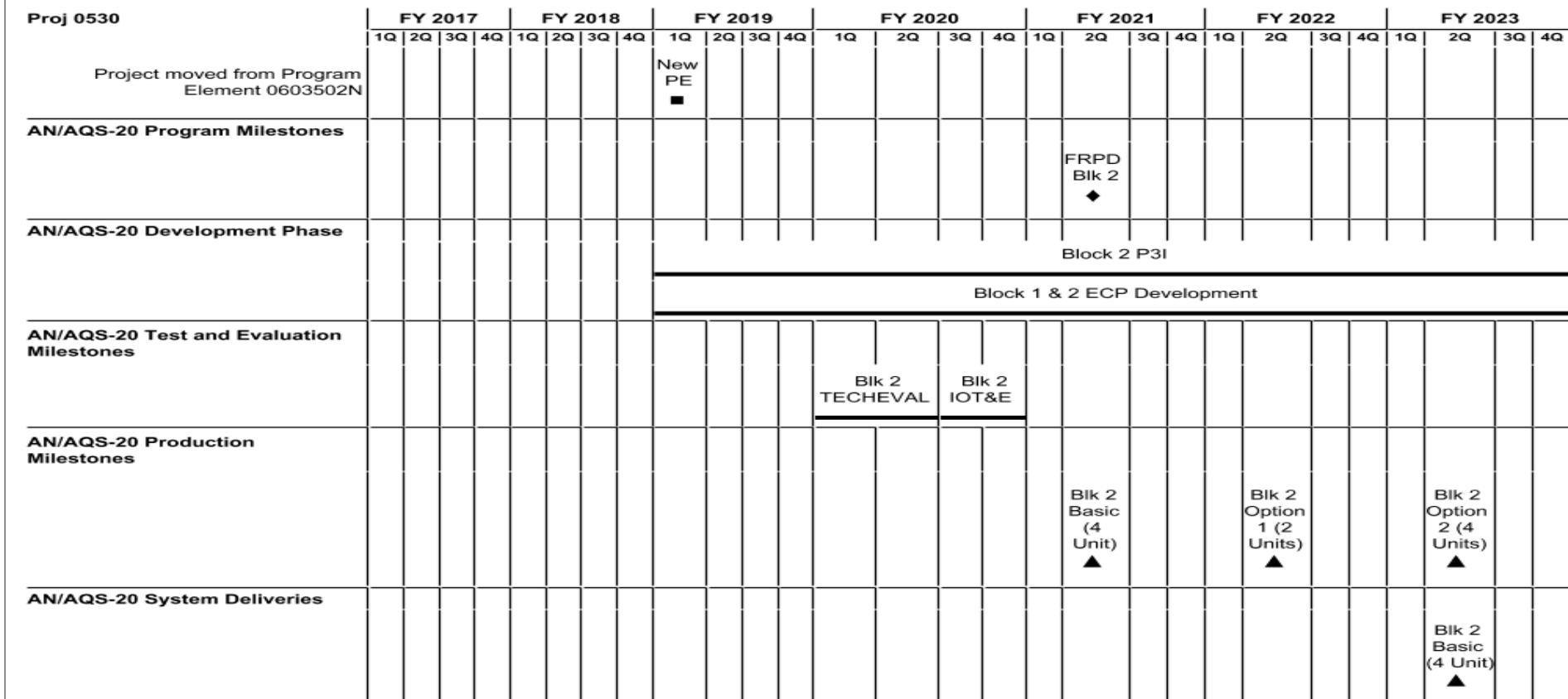
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604127N / Surface Mine
Countermeasures**Project (Number/Name)**

0530 / Mine Hunt Systems



2019PB - 0604127N - 0530

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures	Project (Number/Name) 0530 / Mine Hunt Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0530				
Project moved from Program Element 0603502N: New PE	1	2019	1	2019
AN/AQS-20 Program Milestones: AN/AQS-20 Full Rate Production (FRP) Decision Block 2	2	2021	2	2021
AN/AQS-20 Development Phase: AN/AQS-20 Block 2 P3I	1	2019	4	2023
AN/AQS-20 Development Phase: AN/AQS-20 Materiel Reliability, Obsolescence, and Performance ECP Development (Block 1 & 2)	1	2019	4	2023
AN/AQS-20 Test and Evaluation Milestones: AN/AQS-20 Test Events Block 2 IOT&E	3	2020	4	2020
AN/AQS-20 Test and Evaluation Milestones: AN/AQS-20 Test Events Block 2 TECHEVAL	1	2020	2	2020
AN/AQS-20 Production Milestones: AN/AQS-20 Block 2 New Basic Award (4 Unit)	2	2021	2	2021
AN/AQS-20 Production Milestones: AN/AQS-20 Block 2 Option 1 Award (2 Units)	2	2022	2	2022
AN/AQS-20 Production Milestones: AN/AQS-20 Block 2 Option 2 Award (4 Units)	2	2023	2	2023
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 New Basic Award Systems (4 Unit)	2	2023	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
1233: Surface MCM Mid-life Upgrade	0.000	0.000	0.000	0.000	-	0.000	1.011	1.031	1.054	1.075	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This project provides resources for development, improvement and integration of MCM systems. A description of the major planned programs include the following:

1) AN/SQQ-32(V)4 High-Frequency, Wide Band (HFWB) is a technology upgrade to the AN/SQQ-32 Towed Body which will incorporate HFWB technology into the detection sonar to address performance deficiencies against new mine threats in the littorals. This upgrade will be installed on MCM-1 Class ships with the AN/SQQ-32(V)3 and will develop new transducer modules, fiber optic cable and modify topside processing and display software. 2) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander. 3) Develop and implement Mine Countermeasures Commander's Estimate of the Situation (MCM CES). 4) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a ship of opportunity; 5) The Multi-Function USV replaces the sweep system with a minehunting sensor. The capability leverages off a common USV to conduct minehunting missions. 6) AN/SLQ-60 Mine Neutralization System (MNS) Seafox on the MCM Class ships. MNS is the replacement to the existing AN/SLQ-48 Mine Neutralization System. 7) SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures				Project (Number/Name) 1235 / Mine Warfare Planning and Analysis				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
1235: Mine Warfare Planning and Analysis	0.000	0.000	0.000	10.575	-	10.575	10.763	9.295	8.759	8.907	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note
FY 2018 and prior funding in Program Element (PE) 0603502N. Projects realigned from PE 0603502N starting in FY 2019.

A. Mission Description and Budget Item Justification
Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: MEDAL Product Development FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 1235. FY 2019 Base Plans: FY19 funding will initiate development of the MIW IST. This MIW Integrated Synthetic Trainer is the means in which to conduct Integrated Phase training for MIW forces similar to a Fleet Synthetic Training (FST) event for a CSG/ESG. This tool will provide the capability to train the U.S. Navy's four MIW staffs that include one Theater MIWC and three MCMCs against near peer threats. MIW IST will be a separate tool that executes in conjunction with the MEDAL mission planning and evaluation system used by MIW staffs and units. It will incorporate the laydown of simulated threat minefields expected to be used to blockade ports, defend against landing assaults, or deny access to sea lines of communication and to control the training event. It will use MIW staff created MEDAL MCM plans, underlying MIW databases, and real world environmental databases to generate simulated mission sorties and interactions with the defined minefields. These generated mission files will allow staffs to use MEDAL to evaluate each day's progress determining achieved clearance and remaining risk to ship traffic. MIW IST will have an adjustable "Game Clock" allowing staffs in faster than real time to conduct multi-week long MCM operations in a classroom environment. FY19 work will initially focus on defining user requirements, software design, and transition to an Agile Software development process.	0.000	0.000	5.648	0.000	5.648
Articles:	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures	Project (Number/Name) 1235 / Mine Warfare Planning and Analysis	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY19 funding will also support the MINEnet Tactical development to enhance the Minefield Planning capabilities, support interface changes, and provide updates to sortie planning and databases for the transition of AQS-20A to the AQS-20C configuration. The MEDAL EA course curriculum for MINEnet Tactical 1.3 will be updated and updated software will be fielded to the Mine Warfare Training Center. Work will also begin on MINEnet Tactical v1.4, which will provide the replacement of all commercial-off-the-shelf (COTS) components, which are either near end-of-life or no longer approved in Department of the Navy (DoN) Application and Database Management System (DADMS). Update application as required to support new and approved COTS components. FY19 work will also complete cybersecurity transition from DIACAP to Risk Management Framework (RMF).				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Funding was realigned from PE 0603502N, Project 1235. Increase in FY 2019 funding supports the development of the Mine Warfare (MIW) Integrated Synthetic Trainer (IST) and MINEnet Tactical v1.4.				
Title: MEDAL Support FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 1235. FY 2019 Base Plans: Complete the development of MEDAL EA MINEnet Tactical v1.3 capability and Planning on Risk (PoR). Provide technical integration of developed algorithms and models that have demonstrated effectiveness with respect to objective requirements. Additionally, fielding work will increase and the initial roll out of MINEnet Tactical to the fleet will continue; ramping up the fielding efforts will allow retirement of older MEDAL Build 11 by end of FY19. The support will address fixing software defects and high-priority fleet change requests reported in MINEnet Tactical v1.2.2 and release the upgrades in the MINEnet Tactical v1.3 development baseline. Finally, the support effort will include communication with activities such as applied labs, government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement:				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures	Project (Number/Name) 1235 / Mine Warfare Planning and Analysis				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Funding was realigned from PE 0603502N, Project 1235. Increase in FY 2019 funding supports completing the development of MINEnet Tactical and the ramp up of fielding to the Fleet.						
Title: MEDAL Test and Evaluation	Articles:	0.000	0.000	0.825	0.000	0.825
FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 1235.		-	-	-	-	-
FY 2019 Base Plans: Continue System Development testing activities with multiple platforms including LCS MCM MPAS, ISNS, CANES and ONENET integration tests. Continue Cybersecurity patching and assessments. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding was realigned from PE 0603502N, Project 1235. Increase in FY 2019 funding supports required testing.						
Title: MEDAL Management	Articles:	0.000	0.000	0.915	0.000	0.915
FY 2018 Plans: FY 2018 funding for this program was funded in PE 0603502N, Project 1235.		-	-	-	-	-
FY 2019 Base Plans: Continue to provide program management support and travel for MEDAL program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. As part of the systems engineering element of PM, communicate and coordinate with MIW C4ISR, ICWS, Organic MCM, Mainstreaming MIEW, Expeditionary Warfare C4ISR, tactics development, long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching System (ABS), LCS, and other programs as they relate to MEDAL and MIW Mission Planning, Evaluation, and C4ISR. Other PM tasking to include briefings, demonstrations, and project planning as required.						
FY 2019 OCO Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018								
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures					Project (Number/Name) 1235 / Mine Warfare Planning and Analysis										
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)																		
N/A																		
FY 2018 to FY 2019 Increase/Decrease Statement: Funding was realigned from PE 0603502N, Project 1235. Increase in FY 2019 funding supports required management support.																		
Accomplishments/Planned Programs Subtotals							0.000	0.000	10.575	0.000								
C. Other Program Funding Summary (\$ in Millions)																		
Line Item		FY 2017	FY 2018	FY 2019	FY 2019	FY 2019				Cost To Complete								
• 2622/LV075: Mine Sweeping Replacement (MEDAL).		2.358	3.585	Base 1.111	OCO -	Total 1.111	FY 2020 0.799	FY 2021 0.889	FY 2022 0.891	FY 2023 0.900	Total Cost 0.000							
Remarks																		
D. Acquisition Strategy Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Surface and Mine War-fighting Development Center (SMWDC)). The fleet inputs are then consolidated by COMINEWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software.																		
E. Performance Metrics Mine Warfare and Environmental Decision Aids Library (MEDAL) development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCEnet requirements.																		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures						Project (Number/Name) 1235 / Mine Warfare Planning and Analysis			
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	C/CPAF	SAIC : McLean, VA	0.000	0.000		0.000		5.648	Oct 2018	-		5.648	Continuing	Continuing	Continuing
Subtotal				0.000	0.000	0.000		5.648		-		5.648	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
Support (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	WR	NSWC PC : Panama City FL	0.000	0.000		0.000		3.187	Nov 2018	-		3.187	Continuing	Continuing	Continuing
Subtotal				0.000	0.000	0.000		3.187		-		3.187	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	C/CPAF	SAIC : McLean, VA	0.000	0.000		0.000		0.825	Oct 2018	-		0.825	Continuing	Continuing	Continuing
Subtotal				0.000	0.000	0.000		0.825		-		0.825	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures						Project (Number/Name) 1235 / Mine Warfare Planning and Analysis					
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	WR	NSWC PC : Panama City FI	0.000	0.000		0.000		0.915	Nov 2018	-		0.915	Continuing	Continuing	Continuing
Subtotal		0.000	0.000		0.000		0.915		-		0.915	Continuing	Continuing	N/A	
Remarks FY 2018 and prior funding in Program Element (PE) 0603502N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		10.575		-		10.575	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604127N / Surface Mine
Countermeasures**Project (Number/Name)**

1235 / Mine Warfare Planning and Analysis

MEDAL	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
Acquisition Milestones																															
MEDAL EA V1.X Development									V1.3 Development				V1.4 Development					V1.5 Development													
Test and Evaluation																															
MEDAL EA V1.X Regression Test & Evaluation													V1.3 Test & Evaluation										V1.4 Test & Evaluation								
Delivery Milestones																															
MEDAL EA V1.1 Fielding									V1.2.2 Fielding					V1.3 Fielding									V1.4 Fielding								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604127N / Surface Mine Countermeasures	Project (Number/Name) 1235 / Mine Warfare Planning and Analysis	Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
MEDAL				
Schedule Detail	1	2019	1	2019
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.3X Development	1	2019	4	2019
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.4X Development	1	2020	4	2021
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.5X Development	1	2022	4	2023
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.3X Test & Evaluation	1	2020	1	2020
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.34 Test & Evaluation	1	2022	1	2022
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.2 Fielding	1	2019	4	2019
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.3 Fielding	2	2020	4	2021
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.4 Fielding	2	2022	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	31.940	59.753	52.554	47.278	-	47.278	48.907	51.979	35.605	36.409	Continuing	Continuing
3304: CIRCM	31.940	59.753	5.965	0.000	-	0.000	0.000	0.000	0.000	0.000	223.938	321.596
3348: DAIRCM Development	0.000	0.000	46.589	47.278	-	47.278	48.907	51.979	35.605	36.409	Continuing	Continuing

A. Mission Description and Budget Item Justification

This element includes development of electronic warfare systems for the United States Navy (USN) and United States Marine Corps (USMC) assault aircraft. This includes the development and testing of advanced infrared countermeasures systems for emerging threats and emergency contingencies for Aircraft Survivability Equipment (ASE) suite integration.

FY 2017 Research Development Test and Evaluation (RDT&E) funding is required for a federated Distributed Aperture Infrared Countermeasure (DAIRCM) system in support of Joint Urgent Operational Need Statement (JUONS) S0-0010. Funding covers developmental activities in hardware and software to reduce the size, weight, and power required to achieve a threat (missile, LASER and Hostile Fire) warning detection and defeat system compatible with mission planning information that stores sensor data for post mission threat analysis.

FY 2018 RDT&E overseas contingency operations (OCO) funding is required to finalize testing in support of fielding the federated DAIRCM JUONS system. In addition, DAIRCM Program of Record risk reduction efforts will be funded.

FY 2019 RDT&E funding required for an integrated (under glass) DAIRCM solution on AH-1Z, UH-1Y and MH-60S/R platforms via an Engineering Change Proposal (ECP). Program of Record will eventually support integration and retrofit of 300 USMC and 397 USN aircraft.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018					
Appropriation/Budget Activity	R-1 Program Element (Number/Name)									
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)									
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget	34.920	46.844	47.991	-	47.991					
Current President's Budget	59.753	52.554	47.278	-	47.278					
Total Adjustments	24.833	5.710	-0.713	-	-0.713					
• Congressional General Reductions	-	-								
• Congressional Directed Reductions	-	-								
• Congressional Rescissions	-	-								
• Congressional Adds	-	-								
• Congressional Directed Transfers	-	-								
• Reprogrammings	-3.265	0.000								
• SBIR/STTR Transfer	-1.892	0.000								
• Program Adjustments	37.990	5.710	0.000	-	0.000					
• Rate/Misc Adjustments	0.000	0.000	-0.713	-	-0.713					
• Congressional Directed Reductions	-8.000	-	-	-	-					
Adjustments										
Change Summary Explanation										
The JUONS schedule slid right due to hardware (HW) Electromagnetic Interference (EMI) exceedances found during early testing. The exceedances drove HW modifications that delayed the schedule but identified issues early enough to minimize the impact. The schedule has also been driven by platform integration issues associated with multiple Enhanced GPS/INS units and software transferring/timing issues from older, slower processing chips to more advanced chipsets.										
-JUONS Fielding changed ending quarter from 3 Qtr 2018 to 2 Qtr 2019										
-JUONS A Kit Development added										
-JUONS A Kit Installation Test Aircraft changed end date from 4Q17 to 3Q18										
-JUONS TRR changed from 4Q17 to 1Q19										
-JUONS Fleet Feedback Software Load changed from 1Q19-2Q19 to 3Q19-4Q23										
-JUONS Live Fire Test 1 changed from 1Q17 to 4Q18										
-JUONS Integrated Test 1 changed from 4Q17 to 3Q18										
-JUONS Integrated Test 2 changed from 1Q18 to 4Q18										
-JUONS Live Fire Test 2 changed from 2Q18 to 1Q19										
-JUONS Quick Reaction Assessment changed from 2Q18 to 1Q19										
-JUONS Test Assets Deliveries added										
DAIRCM slid right due to delayed approval of Program of Record.										

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604272N / <i>Tact Air Dir Infrared CM (TADIRCM)</i>
<ul style="list-style-type: none">-DAIRCM SRR changed from 3Q17 to 3Q19-DAIRCM SFR Added-DAIRCM PDR changed from 3Q18 to 1Q20-DAIRCM CDR from 1Q19 to 3Q20-DAIRCM Software Qualification Test from 1Q19 to 4Q21-DAIRCM B-Kit Integration end date extended from 2nd Qtr 2019 to 2nd Qtr 2021-DAIRCM TRR changed from 2Q19 to 1Q21-DAIRCM Integrated Test & Evaluation changed from 3Q19 - 1Q22 to 1Q22 - 2Q22-DAIRCM Live Fire Test 3-5 removed-DAIRCM Operation Assessment Added-DAIRCM ECP Contract Award changed from 2nd Qtr 2018 to 3rd Qtr 2019-DAIRCM SW Val/Ver changed from 1Q19 to 4Q21	

The FY 2019 funding request was reduced by \$0.449M to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3304 / CIRCM				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3304: CIRCM	31.940	59.753	5.965	0.000	-	0.000	0.000	0.000	0.000	0.000	223.938	321.596
Quantity of RDT&E Articles		5	-	-	-	-	-	-	-	-		

Note
Cost to Complete should be ZERO. Total Cost should be 97.658. CIRCM Funds for FY19 through FY23 are realigned to DAIRCM PU 3348.

A. Mission Description and Budget Item Justification
Common Infrared Countermeasures (CIRCM) was a new start for the Navy in FY 2013. This project includes the development, integration, and testing of a laser-based directed infrared countermeasure system for United States Navy and United States Marine Corps assault aircraft. This infrared countermeasure, when integrated with a threat warning detection system, will be capable of countering current and emerging infrared threats. An Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)) Acquisition Decision Memorandum (ADM) dated 15 April 2009 designated the Army as the lead service for developing this capability for rotary-wing, tilt-rotor, and small fixed-wing aircraft across the Department of Defense. It also designated the program as an Acquisition Category (ACAT) ID special interest program. The Army has designated the acquisition effort for this capability as the CIRCM program. CIRCM is being evaluated as a potential replacement for Guardian Laser Tracker Assemblies (GLTA) on the DoN LAIRCM system.

Distributed Aperture Infrared Countermeasure (DAIRCM) developmental activities in hardware and software are being pursued to reduce the size, weight and power required to achieve a threat warning detection system integrated with an infrared countermeasure. DAIRCM development, integration and testing will first be conducted in a federated configuration to support Joint Urgent Operational Need Statement (JUONS) SO-0010 with follow-on work beginning in FY 2018 to provide an integrated (under glass) solution to host platforms. This program develops integrated hardware/software solutions that link on-board integrated Aircraft Survivability Equipment (iASE) that are compatible with mission planning information and store sensor data for post mission threat analysis. This project also adopts future multi-band, networking capabilities to facilitate real-time transfer of threat information, and off-board queuing and control of onboard sensors. CIRCM Funds for FY19 through FY23 are realigned to DAIRCM PU 3348.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: CIRCM Technology Development (TD)	59.753	5.965	0.000	0.000	0.000
FY 2018 Plans: Continuation of EMD contract and GLTA replacement evaluation study.	Articles: 5	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)	Project (Number/Name) 3304 / CIRCM	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continuation of EMD contract.				
FY 2019 Base Plans: CIRCM efforts realigned to support DAIRCM PU 3348.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: CIRCM Funds decreased due to realignment to DAIRCM PU 3348.				
Accomplishments/Planned Programs Subtotals		59.753	5.965	0.000
C. Other Program Funding Summary (\$ in Millions)		0.000	0.000	0.000
N/A				
Remarks				
D. Acquisition Strategy Common Infrared Countermeasures (CIRCM) was a new start for the Navy in FY 2013. CIRCM is an Acquisition Category (ACAT) ID Army lead acquisition program for the development, integration and production of an infrared countermeasure for US Army, US Navy, and US Marine Corps assault aircraft. The Army conducted a 21 month competitive prototyping Technology Development (TD) phase with two contractors. During the TD phase, the contractors developed TD test articles for various test events with emphasis placed on reliability. Contractors concurrently developed preliminary designs for the CIRCM system, conducted systems requirements review, system functional review, and preliminary design review systems engineering technical review events at appropriate times in the schedule. Upon completion of the TD phase, the Army conducted a competition for award of Engineering Manufacturing Development (EMD) contract(s). The EMD phase will be no more than 26 months and will include critical design reviews, test readiness reviews, procurement of 5 EMD test articles in FY 2017 for USN evaluation. The federated DAIRCM system was chosen as the material solution to JUONS SO-0010 and funded via Rapid Acquisition Authority (RAA) with follow-on funding supplied via FY 2017 and FY 2018 Overseas Contingency Operations funding to complete the development, integration and test to support initial fielding in FY 2019. Department of Navy is in the process of developing a Capability Production Document (CPD) to support the transition to an integrated (under glass) solution. Development of the integrated DAIRCM solution will begin in FY 2018. FY2017: Procured 5 CIRCM test assets				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604272N / <i>Tact Air Dir Infrared CM (TADIRCM)</i>	Project (Number/Name) 3304 / CIRCM
FY2018: Guardian Laser Tracker Assemblies(GLTA) Replacement evaluation		
E. Performance Metrics		
FY2017: Procured EMD Test assets		
FY2018: Guardian Laser Tracker Assemblies(GLTA) Replacement evaluation		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)					Project (Number/Name) 3304 / CIRCM						
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary HDW Dev CIRCM	C/CPAF	NGC : Rolling Meadows	0.985	1.736	Apr 2017	5.250	Mar 2018	0.000		-		0.000	0.000	7.971	7.971
Sys Eng Govt CIRCM	WR	NAWC : Patuxent River, MD	6.025	7.832	Dec 2016	0.000		0.000		-		0.000	0.000	13.857	-
Contractor Eng Supt CIRCM	C/CPFF	Alair : Lorton, VA	2.602	2.500	Apr 2017	0.000		0.000		-		0.000	0.000	5.102	5.102
Primary HDW DEV CIRCM	C/CPIF	DRS : Dallas, TX	5.389	8.866	Dec 2016	0.000		0.000		-		0.000	0.000	14.255	14.255
Sys Eng Govt CIRCM	WR	NRL : Washington DC	3.535	1.300	Jan 2017	0.000		0.000		-		0.000	0.000	4.835	-
Sys Eng Gov CIRCM	WR	NUWC : Jacksonville, FL	0.586	1.168	Apr 2017	0.000		0.000		-		0.000	0.000	1.754	-
Primary HDW DEV CIRCM	WR	NRL : Washington DC	0.000	17.100	Aug 2017	0.000		0.000		-		0.000	0.000	17.100	-
Subtotal			19.122	40.502		5.250		0.000		-		0.000	0.000	64.874	N/A

Remarks

FY 2017 overseas contingency operations funding is required for developmental activities in hardware and software to reduce the size, weight, and power required to achieve a missile warning detection system compatible with mission planning information that stores sensor data for post mission threat analysis. Although not included the budget controls \$162.9 million funding is encumbered in support of Joint Urgent Operational Needs Statement SO-0010, entitled "Federated Distributed Aperture Infrared Countermeasures (DAIRCM)" via Rapid Acquisition Authority contract awarded March 2016.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics CIRCM I	WR	NAWC AD : Patuxent River, MD	2.202	0.657	Dec 2016	0.000		0.000		-		0.000	0.000	2.859	-
Integrated Logistics CIRCM II	C/CPFF	Wyle Labs : Huntsville, AL	1.531	0.314	Mar 2017	0.000		0.000		-		0.000	0.000	1.845	1.845
SW Dev CIRCM	WR	NAWCWD : Pt. Mugu, CA	4.050	1.802	Dec 2016	0.000		0.000		-		0.000	0.000	5.852	-
Subtotal			7.783	2.773		0.000		0.000		-		0.000	0.000	10.556	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3304 / CIRCM							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Eng & Eval CIRCM	C/CPFF	Eglin AF Base : Fort Walton Beach FL	0.480	4.182	Dec 2016	0.500	Oct 2017	0.000		-		0.000	0.000	5.162	5.162
Eng & Eval Govt CIRCM	WR	NAWC : Patuxent River, MD	1.641	3.947	Jan 2017	0.000		0.000		-		0.000	0.000	5.588	-
Eng & Eval Govt CIRCM	WR	COTF : VA	0.100	0.455	Jan 2017	0.000		0.000		-		0.000	0.000	0.555	-
Test Equipment	WR	NRL : Washington, DC	0.000	3.911	Aug 2017	0.000		0.000		-		0.000	0.000	3.911	-
Eng & Eval Govt CIRCM	WR	NAWC : China Lake	0.000	0.132	Aug 2017	0.000		0.000		-		0.000	0.000	0.132	-
Test Assets	WR	Threat Systems Mgt : Redstone AL	0.000	2.525	Jul 2017	0.000		0.000		-		0.000	0.000	2.525	-
Subtotal			2.221	15.152		0.500		0.000		-		0.000	0.000	17.873	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor PM Supt CIRCM	C/CPFF	American Electronics : Patuxent River, MD	1.014	0.110	Dec 2016	0.000		0.000		-		0.000	0.000	1.124	1.124
Govt Eng Supt CIRCM	WR	NAWCWD : Pt. Mugu, CA	0.665	0.093	Dec 2016	0.215	Jul 2018	0.000		-		0.000	0.000	0.973	-
Travel CIRCM	WR	NAVAIR : Various	0.490	0.155	Dec 2016	0.000		0.000		-		0.000	0.000	0.645	-
Cost Analysis Supt CIRCM	WR	NAWCAD : Patuxent River, MD	0.645	0.597	Dec 2016	0.000		0.000		-		0.000	0.000	1.242	-
Contractor ILS Supt CIRCM	C/CPFF	NSI : Patuxent River, MD	0.000	0.174	Mar 2017	0.000		0.000		-		0.000	0.000	0.174	0.174
Contractor Eng Supt	C/CPFF	GEORGIA TECH APPLIED RESEARCH CORPO : Atlanta, Ga	0.000	0.197	Jun 2017	0.000		0.000		-		0.000	0.000	0.197	0.197
Subtotal			2.814	1.326		0.215		0.000		-		0.000	0.000	4.355	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3304 / CIRCM					
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	31.940	59.753		5.965		0.000		-	0.000	0.000	97.658	N/A
<u>Remarks</u>												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4 <small>2019PB - 0604272N - 3304</small>	R-1 Program Element (Number/Name) PE 0604272N / <i>Tact Air Dir Infrared CM (TADIRCM)</i>	Project (Number/Name) 3304 / <i>CIRCM</i>

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)	Project (Number/Name) 3304 / CIRCM		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Year				
CIRCM				
Acquisition Milestones: Milestones: Army Milestone C (MS-C)	3	2018	3	2018
Systems Development: Army Functional Configuration Audit (FCA)	4	2017	4	2017
Systems Development: Navy Processer Integration: Navy Processer	2	2018	3	2019
Systems Development: Navy Processer PDR: Navy Processer PDR	3	2018	3	2018
Systems Development: Critical Design Review (CDR): Army CDR	1	2017	1	2017
Systems Development: Reviews: Navy Processer CDR	4	2018	4	2018
Systems Development: Navy Processer Functional Configuration Audit: Functional Configuration Audit (FCA)	2	2020	2	2020
Systems Development: Navy Processer Functional Configuration Audit: Physical Configuration Audit (PCA)	2	2020	2	2020
Test & Evaluation: Processer Flight Test: Flight Test	1	2020	1	2020
Test & Evaluation: Environmental Qualification SFQT: Environmental Qualification SFQT	3	2019	3	2019
Test & Evaluation: Operational Evaluation: Schedule Detail	1	2017	1	2023
Test & Evaluation: Operational Evaluation: Navy Flight Test	1	2017	1	2023
Production Milestones: Contract Awards: Navy Lab test Assets	3	2017	3	2017
Production Milestones: Contract Awards: Navy Processer Contract	2	2018	2	2018
Production Milestones: Contract Awards: Navy Processer LRIP (Separate contract)	2	2019	2	2019
Production Milestones: Deliveries: NAVY Lab Assets Deliveries	3	2019	3	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3348 / DAIRCM Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3348: DAIRCM Development	0.000	0.000	46.589	47.278	-	47.278	48.907	51.979	35.605	36.409	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Distributed Aperture Infrared Countermeasures (DAIRCM) Developmental activities in hardware and software are being pursued to reduce the size, weight and power required to achieve a threat warning detection system integrated with an infrared countermeasure. DAIRCM development, integration and testing will first be conducted in a federated configuration to support Joint Urgent Operational Needs Statement (JUONS) SO-0010 to provide increased survivability against Man-Portable Air Defense Systems (MANPADS), Rocket Propelled Grenades (RPG), hostile gunfire, Anti-Aircraft Artillery (AAA) and laser-directed weapons. Follow-on work begins in FY 2018 to provide an integrated (under glass) solution to the host platforms and will include development efforts to procure future threat technologies. This program develops integrated hardware/software solutions that link on-board integrated Aircraft Survivability Equipment (iASE) that are compatible with mission planning information and store sensor data for post mission threat analysis. This program also adopts future multi-band, networking capabilities to facilitate real-time transfer of threat information, and off-board queuing and control of onboard sensors.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: DAIRCM Development	0.000	46.589	47.278	0.000	47.278
Articles:	-	-	-	-	-
FY 2018 Plans: Planning is beginning in FY 2018 to support Integrated DAIRCM efforts.					
OCO: Planning is beginning in FY 2018 to support Integrated DAIRCM efforts.					
FY 2019 Base Plans: Continuation of integrated DAIRCM efforts					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / <i>Tact Air Dir Infrared CM (TADIRCM)</i>				Project (Number/Name) 3348 / <i>DAIRCM Development</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Funds increased for continued DAIRCM efforts.											
Accomplishments/Planned Programs Subtotals						0.000	46.589	47.278	0.000	47.278	
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APN/0576: <i>Assault DIRCM</i>	27.460	40.970	0.000	9.820	9.820	0.000	0.000	0.000	0.000	0.000	78.250
Remarks											
D. Acquisition Strategy											
The federated Distributed Aperture Infrared Countermeasures (DAIRCM) system is the solution for small/medium aircraft in response to Joint Urgent Operational Need Statement (JUONS) SO-0010. It was funded in FY16 via Rapid Acquisition Authority (RAA) executed from PUC 3304 CIRCM. Follow-on funding supplied via Overseas Contingency Operations in FY 2017 and FY 2019 APN OCO; FY 2018 RDT&E PUC 3348 . Funding provided to complete the development, integration and test to support initial fielding in FY19. Department of Navy is in the process of developing a Capability Production Document (CPD) to support the transition to an integrated (under glass) solution. Development, integration and test of the integrated solution will occur between FY 2018 and FY 2023.											
E. Performance Metrics											
FY 2018: Program of Record Risk Reduction Delivery Order on Navy BOA scheduled for 3Q18.											
FY 2019: Award of ECP to meet statutory regulations scheduled for 3Q19.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3348 / DAIRCM Development							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary HW Dev DAIRCM	C/CPFF	DRS : Dallas, TX	0.000	0.000		10.024	Mar 2018	11.790	Jan 2019	-		11.790	Continuing	Continuing	Continuing
Primaly HW Dev DAIRCM	C/CPFF	Daylight Solutions : San Diego, CA	0.000	0.000		3.194	Mar 2018	8.328	Jan 2019	-		8.328	Continuing	Continuing	Continuing
H-60 Operational Flight Program Dev	C/CPFF	Lockheed Martin : Owego, NY	0.000	0.000		9.420	Mar 2018	5.536	Jan 2019	-		5.536	Continuing	Continuing	Continuing
H-1 Operational Flight Program Deve	C/CPFF	Northrop Grumman : Woodland Hills, CA	0.000	0.000		5.943	Mar 2018	2.820	Jan 2019	-		2.820	Continuing	Continuing	Continuing
Govt Eng Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		2.500	Jan 2018	2.560	Jan 2019	-		2.560	Continuing	Continuing	Continuing
Govt Eng Support	WR	FRC : Jacksonville, FL	0.000	0.000		0.680	Jan 2018	0.700	Jan 2019	-		0.700	Continuing	Continuing	Continuing
Govt Software Eng Support	WR	NAWCAD : PT Mugu	0.000	0.000		2.000	Dec 2017	2.000	Jan 2019	-		2.000	Continuing	Continuing	Continuing
Govt Software Eng Support	WR	NRL : Washington, DC	0.000	0.000		3.807	Jan 2018	2.905	Jan 2019	-		2.905	Continuing	Continuing	Continuing
Govt Integrated Logistic Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.410	Jan 2018	0.500	Jan 2019	-		0.500	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		37.978		37.139		-		37.139	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Govt Integrated Logistic Support	WR	Fleet Readiness Center : Jacksonville, FL	0.000	0.000		0.350	Oct 2017	0.350	Dec 2018	-		0.350	Continuing	Continuing	Continuing
Contractor Logistic Support	SS/CPFF	RIAC : Ft Belvoir, VA	0.000	0.000		0.622	Oct 2017	0.622	Jan 2019	-		0.622	Continuing	Continuing	Continuing
ESOH support	WR	NAWC WD : China lake	0.000	0.000		0.128	Oct 2017	0.131	Jan 2019	-		0.131	Continuing	Continuing	Continuing
Material/Equipment	C/CPFF	CSS : ATK	0.000	0.000		0.325	Oct 2017	4.000	Oct 2018	-		4.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3348 / DAIRCM Development							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistic Support	C/CPAF	DTIC : Ft Belvoir, VA	0.000	0.000		0.213	Jan 2018	0.230	Jan 2019	-		0.230	Continuing	Continuing	Continuing
Commercial Transportation	TBD	Various : Various	0.000	0.000		0.050	Oct 2017	0.050	Oct 2018	-		0.050	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		1.688		5.383		-		5.383	Continuing	Continuing	N/A
Remarks ATK Material/Equipment contract increase due to SM-932 Upgrade.															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Govt T&E Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		1.394	Oct 2017	0.210	Dec 2018	-		0.210	Continuing	Continuing	Continuing
Govt T&E Support	WR	NAWCWD : China Lake, CA	0.000	0.000		0.500	Feb 2018	0.250	Dec 2018	-		0.250	Continuing	Continuing	Continuing
Live Fire	WR	USA DPG : TBD	0.000	0.000		2.000	May 2018	0.571	Mar 2019	-		0.571	Continuing	Continuing	Continuing
Contractor T & E Support	TBD	GWEF : Eglin AFB, FL	0.000	0.000		0.500	Jul 2018	1.225	Feb 2019	-		1.225	Continuing	Continuing	Continuing
Govt T&E Support	WR	COTF : Norfolk, VA	0.000	0.000		0.210	Dec 2017	0.150	Jun 2019	-		0.150	Continuing	Continuing	Continuing
Govt T&E Support	WR	CRANE : CRANE	0.000	0.000		0.500	Jan 2018	0.525	Jun 2019	-		0.525	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		5.104		2.931		-		2.931	Continuing	Continuing	N/A
Remarks Contractor T & E Support to GWEF will increase due to 2 events in FY19.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Govt Eng Support	WR	NAWCWD : China Lake, CA	0.000	0.000		0.200	Oct 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)				Project (Number/Name) 3348 / DAIRCM Development							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Amelex Contractor Mgmt Support	C/CPFF	Amelex : Patuxent River, MD	0.000	0.000		0.200	Nov 2017	0.200	Oct 2018	-		0.200	Continuing	Continuing	Continuing
Engility Contractor Eng Support	C/CPFF	Engility : Patuxent River, MD	0.000	0.000		0.200	Jun 2018	0.200	Oct 2018	-		0.200	Continuing	Continuing	Continuing
Travel DAIRCM	WR	NAVAIR Various : Patuxent River, MD	0.000	0.000		0.300	Dec 2017	0.300	Oct 2018	-		0.300	Continuing	Continuing	Continuing
Govt PM support	WR	NAWCWD : Patuxent River, MD	0.000	0.000		0.699	Dec 2017	0.705	Oct 2018	-		0.705	Continuing	Continuing	Continuing
Govt Eng Support	WR	NSWC : Dahlgren, VA	0.000	0.000		0.020	Jun 2018	0.020	Nov 2018	-		0.020	Continuing	Continuing	Continuing
Eng Support	C/CPFF	DCS : ALEXANDRIA, VA	0.000	0.000		0.200	Feb 2018	0.200	Jan 2019	-		0.200	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		1.819		1.825		-		1.825	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		46.589		47.278		-		47.278	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0604272N / *Tact Air Dir Infrared CM
(TADIRCM)*

Project (Number/Name)

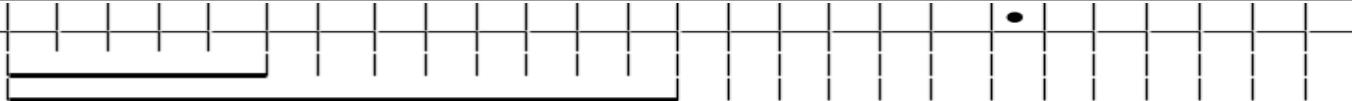
3348 / *DAIRCM Development*

DAIRM LRIP

Deliveries

JUONS Test Assets Deliveries
JUONS Hardware Deliveries

2019PB - 0604272N - 3348



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)	Project (Number/Name) 3348 / DAIRCM Development		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
DAIRCM				
Acquisition Milestones: JUONS Fielding: Schedule Detail		2	2019	4
Acquisition Milestones: DAIRCM Capability Production Document: Schedule Detail		3	2018	3
Systems Development: JUONS A Kit Development: Schedule Detail		1	2017	3
Systems Development: JUONS A Kit Installation Test Aircraft: Schedule Detail (TEST)		3	2017	3
Systems Development: JUONS Critical Design Review (CDR): Schedule Detail		2	2017	2
Systems Development: JUONS B-Kit Integration: Schedule Detail		4	2019	3
Systems Development: JUONS Fleet Feedback Software Load: Schedule Detail		3	2019	4
Systems Development: DAIRCM SRR: Schedule Detail		3	2019	3
Systems Development: DAIRCM SFR: Schedule Detail		4	2019	4
Systems Development: DAIRCM PDR: Schedule Detail		1	2020	1
Systems Development: DAIRCM CDR: Schedule Detail		3	2020	3
Systems Development: DAIRCM Software Qualification Test: Schedule Detail		3	2021	3
Systems Development: DAIRCM Software Validation & Verification: Schedule Detail		4	2021	4
Systems Development: DAIRCM B-Kit Integration: Schedule Detail		3	2019	1
Test and Evaluation: JUONS Test Readiness Review (TRR): Schedule Detail		1	2019	1
Test and Evaluation: JUONS Quick Reaction Assessment: Schedule Detail		1	2019	1
Test and Evaluation: JUONS Integrated Test 1: Schedule Detail		3	2018	3
Test and Evaluation: JUONS Live Fire Test 1: Schedule Detail		3	2018	3
Test and Evaluation: JUONS Integrated Test 2: Schedule Detail		4	2018	4
Test and Evaluation: JUONS Live Fire Test 2: Schedule Detail		1	2019	1
Test and Evaluation: DAIRCM TRR: Schedule Detail		1	2021	1

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604272N / Tact Air Dir Infrared CM (TADIRCM)	Project (Number/Name) 3348 / DAIRCM Development		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	4	2021	1	2022
	1	2022	1	2022
	3	2017	3	2017
	3	2017	3	2017
	3	2017	3	2017
	3	2018	3	2018
	3	2019	3	2019
	2	2022	2	2022
Deliveries: JUONS Test Assets Deliveries: Schedule Detail	3	2017	3	2018
Deliveries: JUONS Hardware Deliveries: Schedule Detail	3	2017	3	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	6.200	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.200
2741: Additive Manufacturing	0.000	0.000	6.200	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.200

Note

-In FY19 these efforts transition to PE 0604289M.

A. Mission Description and Budget Item Justification

This program element supports cost associated with the research and development of Marine Corps Systems Command policy, acquisition process modifications, and prototyping to support the USMC Additive Manufacturing (AM) Initiative under the direction of DC I&L.

The USMC Additive Manufacturing Initiative is an initiative intended to give Marine units access to additive manufacturing techniques to allow them the opportunity to exercise innovation in the resolution of issues affecting unit combat readiness. This PE will support the development of procedures to enable the approval and manufacturing of items requested from Marines. This involves the development of Marine Corps Policy, an approval process, engineering analysis and testing, establishment of facilities to produce prototype additive manufactured parts and development of training to support the Marine Corps use of additive manufacturing. This initiative incorporates development of strategic partnerships with other DoN Systems Commands and field activities to develop DoN standards, processes and other associated acquisition activities to support future use of additive manufacturing in DoN acquisition and readiness areas.

The Next Generation Logistics (NexLog) project supports cost associated with the research and development, experimentation and limited, rapid fielding of emerging logistics capabilities necessary to enable the Fleet Marine Forces to execute the Marine Corps Operating Concept and inform logistics policies. These emerging logistics capabilities include development of autonomous ground, surface and sub-surface materiel distribution systems; development of operational and tactical, in-field digital fabrication capabilities; and, the development of sensor-driven logistics information technology. This element also supports development of strategic partnerships with DoN Systems Commands and field activities in order to leverage their capabilities and align DoN standards and processes, while furthering the use of additive manufacturing, and other emerging logistics technologies, to increase warfighter readiness, capability, survivability and effectiveness.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	6.200	6.200	-	6.200
Current President's Budget	0.000	6.200	0.000	-	0.000
Total Adjustments	0.000	0.000	-6.200	-	-6.200
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	5.000	-	5.000
• Rate/Misc Adjustments	0.000	0.000	-11.200	-	-11.200

Change Summary Explanation

Decrease in FY19 is due to realignment of funds to PE 0604289M.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev				Project (Number/Name) 2741 I Additive Manufacturing				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2741: Additive Manufacturing	0.000	0.000	6.200	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.200	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports cost associated with the research and development of Marine Corps Systems Command policy, acquisition process modifications, prototyping, and future logistics innovations to support the USMC Additive Manufacturing (AM) Initiative under the direction of DC I&L.

The USMC Additive Manufacturing Initiative is an initiative intended to give Marine units access to additive manufacturing techniques to allow them the opportunity to exercise innovation in the resolution of issues affecting unit combat readiness. This effort supports the development of procedures to enable the approval and manufacturing of items requested from Marines. This involves the development of Marine Corps Policy, an approval process, engineering analysis and testing, establishment of facilities to produce prototype additive manufactured parts and development of training to support the Marine Corps use of additive manufacturing. It also includes research and development of autonomous ground cargo delivery systems, tactical employment of in field digital manufacturing, and sensor driven logistics information technology. This initiative incorporates development of strategic partnerships with other DoN Systems Commands and field activities to develop DoN standards, processes and other associated acquisition activities to support future use of additive manufacturing in DoN acquisition and readiness areas.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<i>Title:</i> Expeditionary Logistics - Legacy Equipment and System Readiness Support <i>Articles:</i>	0.000	4.050	0.000	0.000	0.000
FY 2018 Plans: -Initiate efforts to identify and develop Additive Manufacturing (AM) requirements, verification methods, and technical data needed to acquire AM manufactured components. -Initiate fabrication of prototype hardware, fixtures, and jigs that facilitate design processes and procedures for test and performance verification. -Initiate prototype testing to verify component design and reliability attributes.	-	-	-	-	-
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev	Project (Number/Name) 2741 I Additive Manufacturing				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 19 this effort has been realigned to PE 0604289M/Expeditionary Logistics.						
Title: Expeditionary Logistics - Expeditionary Manufacturing and Repair Processes	Articles:	0.000	2.150	0.000	0.000	0.000
FY 2018 Plans: - Initiate system engineering efforts to identify and develop Additive Manufacturing (AM) fabrication requirements, field repair procedures, and technical data needed to effectively repair AM manufactured components. - Initiate certification studies to assess potential performance/integration issues with expeditionary repaired AM parts.		-	-	-	-	-
FY 2019 Base Plans: -In FY19 this effort transitions to PE 0604289M beginning in FY19.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 19 this effort has been realigned to PE 0604289M/Expeditionary Logistics.	Accomplishments/Planned Programs Subtotals	0.000	6.200	0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy The AM program will execute a non-traditional acquisition strategy, due to AM being a set of enabling technologies vice a conventional platform for milestone-driven acquisition. It will incorporate strategic partnerships with other DoN activities, as well as the Joint Staff and services. For that reason, these AM investments are designed to explore future capabilities where AM may resolve gaps in logistical readiness, provide a warfighting solutions, and to mitigate AM-related risk within existing programs of record.						
FY 19 this effort has been realigned to PE 0604289M/Expeditionary Logistics.						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev	Project (Number/Name) 2741 I Additive Manufacturing
E. Performance Metrics		
N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev				Project (Number/Name) 2741 I Additive Manufacturing							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AM Guidebook development	MIPR	NSWC : Carderock, MD	0.000	0.000		0.630	Feb 2018	0.000	Mar 2019	-		0.000	0.000	0.630	-
AM Prototype Parts and Redesign	MIPR	Army : TBD	0.000	0.000		4.220	Feb 2018	0.000	Mar 2019	-		0.000	0.000	4.220	-
AM Structure Design	MIPR	Army/ERDC : Vicksburg, MS	0.000	0.000		1.100	Feb 2018	0.000	Feb 2019	-		0.000	0.000	1.100	-
Subtotal			0.000	0.000		5.950		0.000		-		0.000	0.000	5.950	N/A

Remarks
The AM program will execute a non-traditional acquisition strategy, due to AM being a set of enabling technologies vice a conventional platform for milestone-driven acquisition.
The funding distribution above reflects research and development efforts for additive manufacturing enabling technologies.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Support AM Manuf. and Repair Product	MIPR	NSWC : Carderock, MD	0.000	0.000		0.200	Mar 2018	0.000		-		0.000	0.000	0.200	-
Travel	Various	TBD : TBD	0.000	0.000		0.050	Aug 2018	0.000	Jan 2019	-		0.000	0.000	0.050	-
Subtotal			0.000	0.000		0.250		0.000		-		0.000	0.000	0.250	N/A

Remarks
The AM program will execute a non-traditional acquisition strategy, due to AM being a set of enabling technologies vice a conventional platform for milestone-driven acquisition.
The funding distribution above reflects research and development efforts for additive manufacturing enabling technologies.

			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		6.200		0.000		-		0.000	0.000	6.200	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev					2741 / Additive Manufacturing											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 2741																					
Additive Manufacturing Technologies																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604286M I (U)Marine Corps Additive Manufacturing Tech Dev	Project (Number/Name) 2741 / Additive Manufacturing	
Schedule Details			
Events by Sub Project	Start	End	
Proj 2741	Quarter	Year	Quarter
Additive Manufacturing Technologies	2	2018	4
			2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604289M / Expeditionary Logistics								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	0.000	11.081	-	11.081	9.194	8.608	8.318	8.389	Continuing	Continuing	
2741: Additive Manufacturing	0.000	0.000	0.000	6.135	-	6.135	4.245	3.654	3.360	3.430	Continuing	Continuing	
2743: Next Generation Logistics (NexLog)	0.000	0.000	0.000	4.946	-	4.946	4.949	4.954	4.958	4.959	Continuing	Continuing	

Note

-In FY19 efforts in this PE transferred from PE 0604286M.

A. Mission Description and Budget Item Justification

This program element supports cost associated with the research and development of Marine Corps Systems Command policy, acquisition process modifications, and prototyping to support the USMC Additive Manufacturing (AM) Initiative under the direction of Deputy Commandant, Installations and Logistics (DC I&L).

The USMC Additive Manufacturing Initiative is an initiative intended to give Marine units access to additive manufacturing techniques to allow them the opportunity to exercise innovation in the resolution of issues affecting unit combat readiness. This PE will support the development of procedures to enable the approval and manufacturing of items requested from Marines. This involves the development of Marine Corps Policy, an approval process, engineering analysis and testing, establishment of facilities to produce prototype additive manufactured parts and development of training to support the Marine Corps use of additive manufacturing. This initiative incorporates development of strategic partnerships with other DoN Systems Commands and field activities to develop DoN standards, processes and other associated acquisition activities to support future use of additive manufacturing in DoN acquisition and readiness areas.

The Next Generation Logistics (NexLog) project supports cost associated with the research and development, experimentation and limited, rapid fielding of emerging logistics capabilities necessary to enable the Fleet Marine Forces to execute the Marine Corps Operating Concept and inform logistics policies. These emerging logistics capabilities include development of autonomous ground, surface and sub-surface materiel distribution systems; development of operational and tactical, in-field digital fabrication capabilities; and, the development of sensor-driven logistics information technology. This element also supports development of strategic partnerships with DoN Systems Commands and field activities in order to leverage their capabilities and align DoN standards and processes, while furthering the use of additive manufacturing, and other emerging logistics technologies, to increase warfighter readiness, capability, survivability and effectiveness.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604289M / Expeditionary Logistics			
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	11.081	-	11.081
Total Adjustments	0.000	0.000	11.081	-	11.081
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Rate/Misc Adjustments	0.000	0.000	11.081	-	11.081
Change Summary Explanation					
In FY19 efforts in this PE transferred from PE 0604286M, which had a \$4.9 million increase from 19PB to the current submission (18PB \$6.2M, 19PB \$11.1M). The overall increase of \$4.9 million from FY18 to FY19 is due to NexLog unmanned logistics systems (ground) for small unit maneuver and sustainment , digital manufacturing for in field manufacturing and tactical innovation , and smart logistics for shared warfighter logistics data to collaborate across Marine Air Ground Task Force (MAGTF), to include external partnerships.					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604289M / Expeditionary Logistics				Project (Number/Name) 2741 / Additive Manufacturing				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2741: Additive Manufacturing	0.000	0.000	0.000	6.135	-	6.135	4.245	3.654	3.360	3.430	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This project supports cost associated with the research and development of Marine Corps Systems Command policy, acquisition process modifications, prototyping, and future logistics innovations to support the USMC Additive Manufacturing (AM) Initiative under the direction of DC I&L.

The USMC Additive Manufacturing Initiative is an initiative intended to give Marine units access to additive manufacturing techniques to allow them the opportunity to exercise innovation in the resolution of issues affecting unit combat readiness. This effort supports the development of procedures to enable the approval and manufacturing of items requested from Marines. This involves the development of Marine Corps Policy, an approval process, engineering analysis and testing, establishment of facilities to produce prototype additive manufactured parts and development of training to support the Marine Corps use of additive manufacturing. It also includes research and development of autonomous ground cargo delivery systems, tactical employment of in field digital manufacturing, and sensor driven logistics information technology. This initiative incorporates development of strategic partnerships with other DoN Systems Commands and field activities to develop DoN standards, processes and other associated acquisition activities to support future use of additive manufacturing in DoN acquisition and readiness areas.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
0.000	0.000	6.135	0.000	6.135
-	-	-	-	-

FY 2018 Plans:

-See PE 0604286M

FY 2019 Base Plans:

- Continue efforts to identify and develop Additive Manufacturing (AM) requirements, verification methods, and technical data needed to acquire AM manufactured components.
- Continue fabrication of prototype hardware, fixtures, and jigs that facilitate design processes and procedures for test and performance verification.
- Continue prototype testing to verify component design and reliability attributes.
- Continue system engineering efforts to identify and develop AM fabrication requirements, field repair procedures, and technical data needed to effectively repair AM manufactured components.
- Continue certification studies to assess potential performance/integration issues with expeditionary repaired AM parts.

FY 2019 OCO Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: February 2018					
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604289M / <i>Expeditionary Logistics</i>				Project (Number/Name) 2741 / <i>Additive Manufacturing</i>						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)													
							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
N/A													
FY 2018 to FY 2019 Increase/Decrease Statement: In FY19 these efforts have been realigned from PE 0604286M/(U)Marine Corps Additive Manufacturing Tech Dev.													
Accomplishments/Planned Programs Subtotals							0.000	0.000	6.135	0.000	6.135		
C. Other Program Funding Summary (\$ in Millions)													
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
• RDTEN/0604286M: <i>(U)Marine Corps Additive Manufacturing Tech Dev</i>	0.000	6.200	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.200		
Remarks													
D. Acquisition Strategy The AM program will execute a non-traditional acquisition strategy, due to AM being a set of enabling technologies vice a conventional platform for milestone-driven acquisition. It will incorporate strategic partnerships with other DoN activities, as well as the Joint Staff and services. For that reason, these AM investments are designed to explore future capabilities where AM may resolve gaps in logistical readiness, provide a warfighting solutions, and to mitigate AM-related risk within existing programs of record.													
In FY 19 this effort has been realigned from PE 0604286M/(U)Marine Corps Additive Manufacturing Tech Dev.													
E. Performance Metrics													
N/A													

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604289M / Expeditionary Logistics					Project (Number/Name) 2741 / Additive Manufacturing					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AM Guidebook development	MIPR	NSWC : Dahlgren, VA	0.000	0.000		0.000		0.200	Feb 2019	-		0.200	Continuing	Continuing	Continuing
AM Guidebook development	MIPR	NAVSEA/PSU-ARL : State College, PA	0.000	0.000		0.000		0.350	Feb 2019	-		0.350	Continuing	Continuing	Continuing
AM Guidebook development	MIPR	NSWC : Carderock, MD	0.000	0.000		0.000		0.250	Mar 2019	-		0.250	0.000	0.250	-
AM Training Material	MIPR	JHU-APL : Carderock, MD	0.000	0.000		0.000		0.250	Mar 2019	-		0.250	0.000	0.250	-
AM Technical Data Package Development	MIPR	NAVAIR : Pax River, MD	0.000	0.000		0.000		0.100	Feb 2019	-		0.100	0.000	0.100	-
AM Process Qualification and Certification	MIPR	MITRE : TBD	0.000	0.000		0.000		0.400	Feb 2019	-		0.400	0.000	0.400	-
AM Prototype Parts and Redesign	MIPR	Army : TBD	0.000	0.000		0.000		0.400	Mar 2019	-		0.400	0.000	0.400	-
AM Develop USMC Fleet Wide Repository	MIPR	NAVFAC : TBD	0.000	0.000		0.000		0.250	Feb 2019	-		0.250	0.000	0.250	-
AM Expeditionary Laboratory and Training Facility	Various	TBD : TBD	0.000	0.000		0.000		0.700	Feb 2019	-		0.700	0.000	0.700	-
AM Structure Design	MIPR	rmy/ERDC : Vicksburg, MS	0.000	0.000		0.000		0.500	Feb 2019	-		0.500	0.000	0.500	-
Subtotal			0.000	0.000		0.000		3.400		-		3.400	Continuing	Continuing	N/A

Remarks

The AM program will execute a non-traditional acquisition strategy, due to AM being a set of enabling technologies vice a conventional platform for milestone-driven acquisition. The funding distribution above reflects research and development efforts for additive manufacturing enabling technologies.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AM Identification of Legacy Part	C/FFP	GE : Columbus, OH	0.000	0.000		0.000		0.250	Mar 2019	-		0.250	0.000	0.250	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604289M / Expeditionary Logistics					Project (Number/Name) 2741 / Additive Manufacturing					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AM Identification of New Part	MIPR	JHU-APL : Columbia, MD	0.000	0.000		0.000		0.400	Feb 2019	-		0.400	Continuing	Continuing	Continuing
AM Identify Cases for Prototypes	MIPR	NSWC : Dahlgren, VA	0.000	0.000		0.000		0.300	Mar 2019	-		0.300	0.000	0.300	-
AM Program Acquisition Strategy and Sustainment	MIPR	TBD : TBD	0.000	0.000		0.000		0.885	Feb 2019	-		0.885	0.000	0.885	-
AM Research Advances 3D Printer Technology	MIPR	NSWC-CD : Carderock, MD	0.000	0.000		0.000		0.250	Feb 2019	-		0.250	0.000	0.250	-
AM Identification Advanced Prototyping Lab/ Workspace	MIPR	DTIC / GTRI : TBD	0.000	0.000		0.000		0.600	Feb 2019	-		0.600	0.000	0.600	-
Travel	Various	TBD : TBD	0.000	0.000		0.000		0.050	Jan 2019	-		0.050	0.000	0.050	-
Subtotal			0.000	0.000		0.000		2.735		-		2.735	Continuing	Continuing	N/A
Remarks				The AM program will execute a non-traditional acquisition strategy, due to AM being a set of enabling technologies vice a conventional platform for milestone-driven acquisition. The funding distribution above reflects research and development efforts for additive manufacturing enabling technologies.											
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		6.135		-		6.135	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018
Appropriation/Budget Activity								R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4								PE 0604289M / <i>Expeditionary Logistics</i>				2741 / <i>Additive Manufacturing</i>				
FY 2017				FY 2018				FY 2019				FY 2020				FY 2021
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
Proj 2741																FY 2022
Additive Manufacturing Technologies																FY 2023
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604289M / <i>Expeditionary Logistics</i>	Project (Number/Name) 2741 / <i>Additive Manufacturing</i>	
Schedule Details			
Events by Sub Project		Start	End
Proj 2741		Quarter	Year
Additive Manufacturing Technologies		2	2018
		4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604289M / Expeditionary Logistics				Project (Number/Name) 2743 / Next Generation Logistics (NexLog)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2743: Next Generation Logistics (NexLog)	0.000	0.000	0.000	4.946	-	4.946	4.949	4.954	4.958	4.959	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Next Generation Logistics (NexLog) project supports cost associated with the research and development, experimentation and limited, rapid fielding of emerging logistics capabilities necessary to enable the Fleet Marine Forces to execute the Marine Corps Operating Concept and inform logistics policies. These emerging logistics capabilities include development of autonomous ground, surface and sub-surface materiel distribution systems; development of operational and tactical, in-field digital fabrication capabilities; and, the development of sensor-driven logistics information technology. This element also supports development of strategic partnerships with DoN Systems Commands and field activities in order to leverage their capabilities and align DoN standards and processes, while furthering the use of additive manufacturing, and other emerging logistics technologies, to increase warfighter readiness, capability, survivability and effectiveness.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
0.000	0.000	1.600	0.000	1.600
-	-	-	-	-

FY 2018 Plans:

N/A

FY 2019 Base Plans:

- Initiate USMC ULS-G concept of employment, solutions development, and DOTMLPF analysis, in partnership with the US Army.
- Initiate commercial autonomy and vehicle testing to assess viability of ground combat cargo autonomy technologies for use in a single vehicle or convoy operations.
- Initiate developmental activities to mature amphibious (ship to shore) autonomy technology to create sustainment options for legacy ship to shore connectors.

FY 2019 OCO Plans:

N/A

FY 2018 to FY 2019 Increase/Decrease Statement:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604289M / <i>Expeditionary Logistics</i>	Project (Number/Name) 2743 / <i>Next Generation Logistics (NexLog)</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Increase of \$1.600M from FY 2018 to FY 2019 is due to initiation of ground combat cargo autonomy RDTEN efforts.					
Title: Digital Manufacturing For In-field Manufacturing and Tactical Innovation FY 2018 Plans: N/A FY 2019 Base Plans: - Initiate development of USMC Digital Manufacturing labs, aka Maker Spaces, for warfighter training, technology familiarization, and innovation. - Initiate systems engineering for Organizational-Level (O-Level) deployable tactical manufacturing kits for in-field manufacturing (e.g., in-field 3D printed squad quadcopter) and tactical innovation. - Initiate development commercial, secure, tactical manufacturing information technologies for technical project data sharing, community development, and lessons learned. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$1.250M from FY 2018 to FY 2019 is due to initiation of USMC Digital Manufacturing labs RDTEN efforts.	Articles: - 0.000	0.000	1.250	0.000	1.250
Title: Smart Logistics for Shared Warfighter Logistics Data to Collaborate Across MAGTF and External Partners FY 2018 Plans: N/A FY 2019 Base Plans: - Initiate systems engineering efforts to develop a Smart Logistics data/IT test environment to assess technologies, mitigate vulnerabilities, develop future system requirements, and support business case analysis. - Initiate assessments of commercially available sensors and data storage for the ability to provide accurate and timely	Articles: - 0.000	0.000	2.096	0.000	2.096

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604289M / <i>Expeditionary Logistics</i>	Project (Number/Name) 2743 / <i>Next Generation Logistics (NexLog)</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
logistics information awareness. - Initiate the development machine learning-enhanced tactical logistics decision support tools for use in training, garrison, and deployed operations. - Initiate assessments of systems for augmented reality technologies to support supply, maintenance, and medical data visualization.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$2.096M from FY 2018 to FY 2019 is due to initiation of Smart Logistics for Shared Warfighter Data RDTEN efforts.				
Accomplishments/Planned Programs Subtotals		0.000	0.000	4.946
C. Other Program Funding Summary (\$ in Millions)		0.000	0.000	4.946
Remarks				
D. Acquisition Strategy NexLog will incorporate strategic partnerships with other DoN activities, as well as the Joint Staff and services. For that reason, these investments are designed to explore future capabilities that may resolve gaps in logistical readiness, provide a warfighting solutions, and to mitigate Log-related risk within existing programs of record.				
In FY 19 this effort has been realigned from PE 0604286M/(U)Marine Corps Additive Manufacturing Tech Dev.				
E. Performance Metrics				
N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604289M / Expeditionary Logistics					Project (Number/Name) 2743 / Next Generation Logistics (NexLog)					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ULS-G Development	MIPR	NSWC : PANAMA CITY, FL	0.000	0.000		0.000		0.400	Jan 2019	-		0.400	Continuing	Continuing	Continuing
Develop Maker Labs	C/FFP	Building Momentum : Arlington, VA	0.000	0.000		0.000		0.600	Jan 2019	-		0.600	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.000		-		1.000	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ULS-Ground	C/FFP	TBD : TBD	0.000	0.000		0.000		0.350	Jan 2019	-		0.350	0.000	0.350	-
ULS-Ground COTS	C/FFP	TBD : TBD	0.000	0.000		0.000		0.800	Feb 2019	-		0.800	0.000	0.800	-
SE for Tactical Manufacturing Kits	MIPR	NSWC - CD : Carderock, MD	0.000	0.000		0.000		0.400	Jan 2019	-		0.400	0.000	0.400	-
Tactical Manufacturing Data and IT	MIPR	NSWC - CD : Carderock, MD	0.000	0.000		0.000		0.250	Jan 2019	-		0.250	0.000	0.250	-
Smart Log COTS Sensors Assessment	C/FFP	TBD : TBD	0.000	0.000		0.000		0.600	Mar 2019	-		0.600	0.000	0.600	-
Smart Log AI Tools	C/FFP	TBD : TBD	0.000	0.000		0.000		0.300	Mar 2019	-		0.300	0.000	0.300	-
Smart Log Augmented Reality Assessment	C/FFP	TBD : TBD	0.000	0.000		0.000		0.350	Mar 2019	-		0.350	0.000	0.350	-
Travel	Various	TBD : TBD	0.000	0.000		0.000		0.050	Jan 2019	-		0.050	0.000	0.050	-
Subtotal			0.000	0.000		0.000		3.100		-		3.100	0.000	3.100	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SE for Smart Log TEST/DEC	C/FFP	TBD : TBD	0.000	0.000		0.000		0.846	Mar 2019	-		0.846	0.000	0.846	-
Subtotal			0.000	0.000		0.000		0.846		-		0.846	0.000	0.846	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604289M / Expeditionary Logistics				Project (Number/Name) 2743 / Next Generation Logistics (NexLog)						
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
	Project Cost Totals	0.000	0.000		0.000		4.946		-	4.946	Continuing	Continuing	N/A
Remarks													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																Date: February 2018								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)								
1319 / 4								PE 0604289M / <i>Expeditionary Logistics</i>								2743 / <i>Next Generation Logistics (NexLog)</i>								
Proj 2743																								
FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1
NEXTLOG: Smart Logistics/MAGTF								[REDACTED]																
NEXTLOG: Digital Manufacturing								[REDACTED]																
NEXTLOG: ULS Ground								[REDACTED]																

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604289M / <i>Expeditionary Logistics</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2743				
NEXTLOG: Smart Logistics/MAGTF	1	2019	4	2023
NEXTLOG: Digital Manufacturing	1	2019	4	2023
NEXTLOG: ULS Ground	1	2019	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604292N / (U)MH-XX										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	7.469	1.618	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.087			
2934: MH-XX	7.469	1.618	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.087			
A. Mission Description and Budget Item Justification															
The MH-XX project directs developmental activities in support of the replacement of the current inventory of Navy and Marine Corps helicopters in the 2030+ timeframe through the Joint Future Vertical Lift (FVL) family of systems program. Specific developmental activities will include: capability requirements definition, documentation, and approval; support to the Joint Multi-Role Technology Demonstrator and Joint Future Vertical Lift, including Common Systems Integrated Product Team leadership, open hardware and software reference and objective architectures definition, mission system interoperability, and shipboard compatibility; Analysis of Alternatives planning and execution; and associated affordability studies. Follow-on activities support preparation and execution of efforts to develop common systems reference and objective open architectures, and eventual prototype aircraft flight demonstrations in support of the FVL Technology Maturation and Risk Reduction acquisition phase. Activities and technologies developed also have the potential to be leveraged for sustainment of legacy Navy and Marine Corps helicopters. These efforts will enable timely development of a system which provides best value and capability to the Joint Warfighter while maintaining effective and efficient war fighting capability in support of the Navy/Marine Corps 30-year Aviation Plan.															
The MH-XX Program has been terminated in FY 2018 and out pending results of the MH-60S Service Life Assessment Program.															
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total							
Previous President's Budget				1.620	0.000	0.000	-	0.000							
Current President's Budget				1.618	0.000	0.000	-	0.000							
Total Adjustments				-0.002	0.000	0.000	-	0.000							
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments 				-	-	-	-								
				-	-	-	-								
				-	-	-	-								
				-	-	-	-								
				-	-	-	-								
				-0.002	0.000	0.000	-	0.000							
				0.000	0.000	0.000	-	0.000							
Change Summary Explanation															
Technical: Not applicable.															
Schedule: The schedule has been updated to add the delivery of a Radio Frequency (RF) Survivability Assessment Study. The development and delivery of the RF Survivability Assessment Study will inform upgrade options for the MH-60S Radar Warning Receiver systems.															

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604292N I (U)MH-XX				Project (Number/Name) 2934 I MH-XX			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2934: MH-XX	7.469	1.618	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.087
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	

A. Mission Description and Budget Item Justification

The MH-XX project directs Naval Aviation developmental activities in support of the replacement of the Navy H-60 series helicopters, multi-mission medium lift helicopter capability, in the 2030+ timeframe. These aircraft will be used extensively to protect Joint assets from airborne, surface, and sub-surface threats. Other supported mission areas will include Combat Search and Rescue, Naval Special Warfare, Humanitarian Assistance/Disaster Relief, Logistics, and Medical Evacuation. Specific developmental activities will include: capability requirements definition documentation, and approval; support to the Joint Multi-Role Technology Demonstrator (JMR TD) and Joint Future Vertical Lift including Common Systems Integrated Product Team leadership, open hardware and software reference and objective architectures definition, common hardware prototyping efforts, mission system interoperability, and shipboard compatibility; Analysis of Alternatives planning and execution; and associated affordability studies. These activities will result in completion of all pre-system acquisition documentation required for a Material Development Decision in first quarter FY 2017. These efforts will enable timely development of a system which provides best value to the Joint Warfighter and Naval Aviation while maintaining effective and efficient war fighting capability in support of the Navy's 30-year Aviation Plan.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: MH-XX Requirements Definition and Acquisition Documentation					
FY 2018 Plans: N/A					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals				1.618	0.000
				0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604292N / (U)MH-XX	Project (Number/Name) 2934 / MH-XX
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy Provide research and development support for Pre-Milestone A activities, predominantly government, to enable replacement of the Navy H-60 series helicopters, multi-mission medium lift helicopter capability, in the 2030+ timeframe.		
E. Performance Metrics Completion of business metrics and reference architecture white papers.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604292N / (U)MH-XX					Project (Number/Name) 2934 / MH-XX					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	3.202	0.504	Aug 2017	0.000		0.000		-		0.000	0.000	3.706	-
Trade Studies/ Requirements Analysis	Various	Various : Various	3.317	1.011	Apr 2017	0.000		0.000		-		0.000	0.000	4.328	-
Subtotal		6.519	1.515		0.000		0.000		-		0.000	0.000	8.034	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	WR	NAWCAD : Patuxent River, MD	0.920	0.084	Dec 2016	0.000		0.000		-		0.000	0.000	1.004	-
Travel	Various	Various : Various	0.030	0.019	Oct 2016	0.000		0.000		-		0.000	0.000	0.049	-
Subtotal		0.950	0.103		0.000		0.000		-		0.000	0.000	1.053	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			7.469	1.618		0.000		0.000		-		0.000	0.000	9.087	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0604292N / (U)MH-XX

Project (Number/Name)

2934 / MH-XX

Proj 2934	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
	Design Analysis Trade Studies																														
Deliverables																															
	Business Metrics White Paper																														
	Reference Architecture White Paper																														
	Reference RF Survivability Assessment																														

2019DON - 0604292N - 2934

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604292N / (U)MH-XX	Project (Number/Name) 2934 / MH-XX		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 2934</i>				
Acquisition Milestones: Planning: Design Analysis Trade Studies		1	2017	4
Deliverables: Business Metrics White Paper		1	2017	2
Deliverables: Reference Architecture White Paper		1	2017	1
Deliverables: RF Survivability Assessment		4	2017	3

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604320M / Rapid Technology Capability Prototype								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	7.055	7.107	-	7.107	7.271	7.423	7.576	7.734	Continuing	Continuing	
0386: Rapid Prototype Development, Marine Corps	0.000	0.000	7.055	7.107	-	7.107	7.271	7.423	7.576	7.734	Continuing	Continuing	

A. Mission Description and Budget Item Justification

The Commandant of the Marine Corps (CMC) directed the formation of the Marine Corps Rapid Capabilities Office (MRCO) to accelerate the identification, development and assessment of capabilities that appear to offer significant military utility. The MRCO will seek emergent and disruptive technology to rapidly develop and deliver operational prototypes that increase Operating Forces' survivability and lethality, and that will inform requirement development and investment planning. Prototypes to be assessed will be at a Technology Readiness Level 7 or higher and can be either non developmental government off the shelf, non-developmental commercial off the shelf, or developmental items.

FY18 efforts include, but are not limited to, product development and operational forces assessment for Tactical Electro-Magnetic Signature Operations and Support (TEMSOS), Long Range Precision Fires, and Unmanned Swarm Systems. TEMSOS will provide enhanced uninterrupted intra-unit communications, alternate precision navigation, friendly force electromagnetic signature monitoring, enhanced situational awareness, and tactical advantage through electronic attack. Unmanned Swarm Systems provide small armored aerial survey, search, and attack capabilities fused with artificial intelligence to enhance situational awareness and decision making. Long Range Precision Fires will provide long-range guided anti-armor precision fires with both on-board and meshed data links for enhanced targeting accuracy for this small unmanned aircraft munition. These three capabilities have been identified as key immediate Operational Force survivability and lethality enablers to countercurrent enemy capabilities.

FY19 efforts include Autonomous Vehicles, Tactical Information Warfare, and Urban Engagement Systems.

Autonomous Vehicles: This effort will identify, prototype, and assess the use in a variety of combat and supporting use employments, vehicles capable of sensing their environment, while navigating and functioning independently without human conduction to take evasive or defensive action and avoid detection, tracking, targeting or attack, provide an alternative reconnoiter capability in non-permissive settings for the purpose of mapping and patrolling for the purpose of intensifying combat power and reducing risk to the force.

Tactical Information Warfare: This effort will identify, prototype, and assess various information systems that provide small unit ability to undermine local opposing force information quality, while ensuring friendly forces a timely, accurate, superior capability to automatically correlate relevant active and passive information from organic and non-organic sensors that will increase their combat effectiveness in this emerging warfighting discipline.

Urban Engagement Systems: This effort will identify, prototype and assess small unit systems to provide them enhanced situational awareness to locate and track opposing forces in tall buildings, narrow alleys, sewage tunnels and subway systems in order to minimize friendly force exposure, reduce potential collateral damage, and offer increased force protection measures by means of amplified lethality, improved discrimination ability, and enhances survivability.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604320M / Rapid Technology Capability Prototype			
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Previous President's Budget		0.000	7.055	7.196	-
Current President's Budget		0.000	7.055	7.107	-
Total Adjustments		0.000	0.000	-0.089	-
• Congressional General Reductions		-	-		
• Congressional Directed Reductions		-	-		
• Congressional Rescissions		-	-		
• Congressional Adds		-	-		
• Congressional Directed Transfers		-	-		
• Reprogrammings		-	-		
• SBIR/STTR Transfer		-	-		
• Rate/Misc Adjustments		0.000	0.000	-0.089	-
					-0.089

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0604320M / Rapid Technology Capability Prototype				0386 / Rapid Prototype Development, Marine Corps				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0386: <i>Rapid Prototype Development, Marine Corps</i>	0.000	0.000	7.055	7.107	-	7.107	7.271	7.423	7.576	7.734	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Commandant of the Marine Corps (CMC) directed the formation of the Marine Corps Rapid Capabilities Office (MRCO) to accelerate the identification, development and assessment of capabilities that appear to offer significant military utility. The MRCO will seek emergent and disruptive technology to rapidly develop and deliver operational prototypes that increase Operating Forces' survivability and lethality, and that will inform requirement development and investment planning. Prototypes to be assessed will be at a Technology Readiness Level 7 or higher and can be either non developmental government off the shelf, non-developmental commercial off the shelf, or developmental items.

MRCO is not an acquisition program. MRCO implements one-time buys of various capabilities for operational assessments and does not sustain nor provide enduring support beyond the operational assessment period. If a capability requires sustainment and enduring support it will transition to the traditional acquisition process.

FY19 efforts include Autonomous Vehicles, Tactical Information Warfare, and Urban Engagement Systems.

Autonomous Vehicles: effort will identify, prototype, and assess the use in a variety of combat and supporting use employments, vehicles capable of sensing their environment, while navigating and functioning independently without human conduction to take evasive or defensive action and avoid detection, tracking, targeting or attack, provide an alternative reconnoiter capability in non-permissive settings for the purpose of mapping and patrolling for the purpose of intensifying combat power and reducing risk to the force.

Tactical Information Warfare: effort will identify, prototype, and assess various information systems that provide small unit ability to undermine local opposing force information quality, while ensuring friendly forces a timely, accurate, superior capability to automatically correlate relevant active and passive information from organic and non-organic sensors that will increase their combat effectiveness in this emerging war-fighting discipline.

Urban Engagement Systems: effort will identify, prototype and assess small unit systems to provide them enhanced situational awareness to locate and track opposing forces in tall buildings, narrow alleys, sewage tunnels and subway systems in order to minimize friendly force exposure, reduce potential collateral damage, and offer increased force protection measures by means of amplified lethality, improved discrimination ability, and enhances survivability.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Product Development	0.000	5.630	5.878	0.000	5.878

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype	Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Articles:		-	-	-	-	-
FY 2018 Plans: - Initiate Certifications/Studies/Reports and Prototype Purchase/Development/Integration of MCRCO portfolio: - Initiate product development of Tactical Electro-Magnetic Spectrum capabilities. - Initiate product development of unmanned aerial, surface, and underwater vehicles (UAV, USV, and UUV) swarm capability. - Initiate product development of a Long Range Precision Fires capability.						
FY 2019 Base Plans: FY19 Product Development Autonomous Vehicles: Initiate efforts to identify, prototype, and assess the use in a variety of combat and supporting use employments, vehicles capable of sensing their environment, while navigating and functioning independently without human conduction to take evasive or defensive action and avoid detection, tracking, targeting or attack, provide an alternative reconnoiter capability in non-permissive settings for the purpose of mapping and patrolling for the purpose of intensifying combat power and reducing risk to the force. FY19 Product Development Tactical Information Warfare: Initiate efforts to identify, prototype, and assess various information systems that provide small unit ability to undermine local opposing force information quality, while ensuring friendly forces a timely, accurate, superior capability to automatically correlate relevant active and passive information from organic and non-organic sensors that will increase their combat effectiveness in this emerging war-fighting discipline. FY19 Product Development Urban Engagement Systems: Initiate efforts to identify, prototype and assess small unit systems to provide them enhanced situational awareness to locate and track opposing forces in tall buildings, narrow alleys, sewage tunnels and subway systems in order to minimize friendly force exposure, reduce potential collateral damage, and offer increased force protection measures by means of amplified lethality, improved discrimination ability, and enhances survivability.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype	Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Net increase of \$0.248M reflects a slightly higher product development emphasis from FY18 to FY19 within Rapid Prototype Development efforts.						
Title: Support	Articles:	0.000	1.050	0.566	0.000	0.566
FY 2018 Plans: - Initiate Operational Force Assessments of MCRCO portfolio: - Initiate support of Tactical Electro-Magnetic Spectrum capabilities. - Initiate support of unmanned aerial, surface, and underwater vehicles (UAV, USV, and UUV) swarm capability. - Initiate support development and operational assessment of a Long Range Precision Fires capability.		-	-	-	-	-
FY 2019 Base Plans: FY19 Initiate support efforts to include development of a innovation portal and other data collection efforts.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The decrease of \$0.484M reflects a reduction in overall Rapid Prototype Development support costs from FY18 to FY19.						
Title: Management	Articles:	0.000	0.375	0.000	0.000	0.000
FY 2018 Plans: - Initiate Management Services of the new-start MCRCO: Engineering Analysis and program office support		-	-	-	-	-
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: The decrease of \$0.375M reflects a reduction in overall Rapid Prototype Development management costs from FY18 to FY19.						
Title: Test & Evaluation		0.000	0.000	0.663	0.000	0.663

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype		Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							
			FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Articles:			-	-	-	-	-
FY 2018 Plans: N/A							
FY 2019 Base Plans: FY19 Autonomous Vehicles: Initiate efforts to test and evaluate prototypes to assess their use in a variety of combat and supporting use employments. Vehicles tested will be capable of sensing their environment, while navigating and functioning independently without human conduction, taking evasive or defensive action, avoiding detection, tracking, targeting, attacking, provide an alternative reconnoiter capability in non-permissive settings for the purpose of mapping and patrolling for the purpose of intensifying combat power. The purpose of this effort is to reduce risk to the force.							
FY19 Operations Forces (OPFOR) Assessment Information Warfare: Initiate efforts to test and evaluate prototypes to assess various information systems that provide small unit ability to undermine local opposing force information quality, while ensuring friendly forces a timely, accurate, superior capability to automatically correlate relevant active and passive information from organic and non-organic sensors.							
FY19 Operations Forces (OPFOR) Assessment Urban Engagement Systems: Initiate efforts to test and evaluate prototypes to assess a state of the art urban range with appropriate buildings and streets that properly reflect an urban environment. Systems must locate and track opposing forces in tall buildings, narrow alleys, sewage tunnels and subway systems in order to minimize friendly force exposure, reduce potential collateral damage, and offer increased force protection.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: The increase of \$0.663M from FY18 to FY19 reflects Test and Evaluation costs in support of FY19 Rapid Prototype Development efforts.							
Accomplishments/Planned Programs Subtotals			0.000	7.055	7.107	0.000	7.107
C. Other Program Funding Summary (\$ in Millions)							
N/A							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604320M / <i>Rapid Technology Capability Prototype</i>	Project (Number/Name) 0386 / <i>Rapid Prototype Development, Marine Corps</i>
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy <p>The MCRCO Process consists of three phases, Identify, Assess, and Inform, where each have unique function support of the mission. All MCRCO projects will align to this phased approach. In the Identify Phase the MCRCO undertakes a continuous process of investigation and compiling of technologies, concepts, and prototypes for various capability areas. Activities in this phase include but are not limited to research, war gaming/lectures/and external experiment attendance, industry and FFRDC engagements, Innovation Portal Challenges and Forums, gap identification, and emerging technology analysis. This is also where the MCRCO portfolio of projects are determined and approved for execution.</p> <p>In the Assess Phase the operational assessments are performed by the MCRCO. These assessments of capability prototypes are categorized by complexity of effort and the perceived time it will take to conduct the assessment. The Capability Assessment Categories (CAC) are:</p> <p>CAC 1 - Non Developmental Capability Prototype - Plug and Play (1-90 days) CAC 2 - Integration Capability Prototype -Reconfigure and Play (91-180 days) CAC 3 - Developmental Capability Prototype - Develop and Play (181-360 days)</p> <p>The assess phase has three utility focuses that prototypes must demonstrate prior to being assessed: Military Utility, Enabling Competition, and Lifecycle Affordability. The Inform Phase not only provides the results of the assessment event, but it also tracks the performance of the acquisition process. The goal is to deliver the capability rapidly to support warfighter requirements . It focuses its efforts on measuring the time it takes for key acquisition events to occur. These events include but are not limited to requirements transition, contract award, production, test, and fielding. Other Measure of Effectiveness will focus on costs and rework associated with acquisition process.</p>		
E. Performance Metrics <p>There will be 33% and 66% assessment reviews, where assessments will either continue forward to completion or project ended. All reviews will be documented in the Capability Assessment Report.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype				Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Certifications, Studies, Reports_Tactical EM	Various	Not Specified : Not Specified	0.000	0.000		0.500	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Certifications, Studies, Reports_Swarm	Various	Not Specified : Not Specified	0.000	0.000		0.500	Nov 2017	0.000		-		0.000	0.000	0.500	-
Certifications, Studies, Reports_Fires	Various	Not Specified : Not Specified	0.000	0.000		0.130	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Prototype Purchase, Development, and Integration_Tactical EM	Various	Not Specified : Not Specified	0.000	0.000		1.750	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Prototype Purchase, Development, and Integration_Swarm	Various	Not Specified : Not Specified	0.000	0.000		1.750	Nov 2017	0.000		-		0.000	0.000	1.750	-
Prototype Purchase, Development, and Integration_Fires	Various	Not Specified : Not Specified	0.000	0.000		1.000	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Autonomous Vehicles Development	TBD	NSWC : Panama City, FL	0.000	0.000		0.000		0.250	Dec 2018	-		0.250	0.000	0.250	-
Information Warfare Development	TBD	NSWC : Crane, IN	0.000	0.000		0.000		0.250	Dec 2018	-		0.250	0.000	0.250	-
Urban Engagement Systems Development	TBD	NSWC : Corona, CA	0.000	0.000		0.000		0.130	Dec 2018	-		0.130	0.000	0.130	-
Autonomous Vehicle Contract Award	TBD	MCSC : Quantico, VA	0.000	0.000		0.000		2.248	Feb 2019	-		2.248	0.000	2.248	-
Information Warfare Contract Award	TBD	MCSC : Quantico, VA	0.000	0.000		0.000		2.000	Feb 2019	-		2.000	0.000	2.000	-
Urban Engagement Systems Contract Award	TBD	MCSC : Quantico, VA	0.000	0.000		0.000		1.000	Feb 2019	-		1.000	0.000	1.000	-
Subtotal			0.000	0.000		5.630		5.878		-		5.878	Continuing	Continuing	N/A

Remarks

FY19 Product Development Autonomous Vehicles: effort will identify, prototype, and assess the use in a variety of combat and supporting use employments, vehicles capable of sensing their environment, while navigating and functioning independently without human conduction to take evasive or defensive action and avoid detection, tracking, targeting

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype				Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
or attack, provide an alternative reconnoiter capability in non-permissive settings for the purpose of mapping and patrolling for the purpose of intensifying combat power and reducing risk to the force.															
FY19 Product Development Tactical Information Warfare: effort will identify, prototype, and assess various information systems that provide small unit ability to undermine local opposing force information quality, while ensuring friendly forces a timely, accurate, superior capability to automatically correlate relevant active and passive information from organic and non-organic sensors that will increase their combat effectiveness in this emerging warfighting discipline.															
FY19 Product Development Urban Engagement Systems; efforts will identify, prototype and assess small unit systems to provide them enhanced situational awareness to locate and track opposing forces in tall buildings, narrow alleys, sewage tunnels and subway systems in order to minimize friendly force exposure, reduce potential collateral damage, and offer increased force protection measures by means of amplified lethality, improved discrimination ability, and enhances survivability.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Tactical EM	Various	Not Specified : Not Specified	0.000	0.000		0.425	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Swarm	Various	Not Specified : Not Specified	0.000	0.000		0.425	Jan 2018	0.000		-		0.000	0.000	0.425	-
Fires	Various	Not Specified : Not Specified	0.000	0.000		0.200	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Analysis and program office support	C/FFP	MCSC : Quantico, VA	0.000	0.000		0.000		0.566	Mar 2019	-		0.566	0.000	0.566	-
Subtotal			0.000	0.000		1.050		0.566		-		0.566	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Autonomous Vehicles OPFOR Assessment	TBD	Yuma Proving Grounds : Yuma, AZ	0.000	0.000		0.000		0.250	Mar 2019	-		0.250	0.000	0.250	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype			
Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Information Warfare OPFOR Assessment	TBD	Electronic Proving Ground (EPG) : Ft Huachuca, AZ	0.000	0.000		0.000		0.263	Mar 2019	-		0.263	0.000	0.263	-
Urban Engagement Systems OPFOR Assessment	C/BA	Muscatatuck : Bulerville, IN	0.000	0.000		0.000		0.150	Mar 2019	-		0.150	0.000	0.150	-
Subtotal		0.000	0.000		0.000		0.663		-		0.663	0.000	0.663	N/A	
Remarks															
FY19 Operations Forces (OPFOR) Assessment Autonomous Vehicles: effort test prototypes, and assess the use in a variety of combat and supporting use employments, vehicles capable of sensing their environment, while navigating and functioning independently without human conduction to take evasive or defensive action and avoid detection, tracking, targeting or attack, provide an alternative reconnoiter capability in non-permissive settings for the purpose of mapping and patrolling for the purpose of intensifying combat power and reducing risk to the force.															
FY19 OPFOR Assessment Information Warfare: effort will test prototypes, and assess various information systems that provide small unit ability to undermine local opposing force information quality, while ensuring friendly forces a timely, accurate, superior capability to automatically correlate relevant active and passive information from organic and non-organic sensors.															
FY19 OPFOR Assessment Urban Engagement Systems; efforts will test prototypes on a state of the art urban range with appropriate buildings and streets that properly reflect an urban environment. Systems must locate and track opposing forces in tall buildings, narrow alleys, sewage tunnels and subway systems in order to minimize friendly force exposure, reduce potential collateral damage, and offer increased force protection.															
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Analysis Services	WR	NSWC Crane : Crane, IN	0.000	0.000		0.150	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program office support	TBD	TBD : Not Specified	0.000	0.000		0.225	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal		0.000	0.000		0.375		0.000		-		0.000	Continuing	Continuing	N/A	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604320M / Rapid Technology Capability Prototype				Project (Number/Name) 0386 / Rapid Prototype Development, Marine Corps					
	Prior Years	FY 2017	FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	7.055		7.107		-		7.107	Continuing	Continuing	N/A
Remarks												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

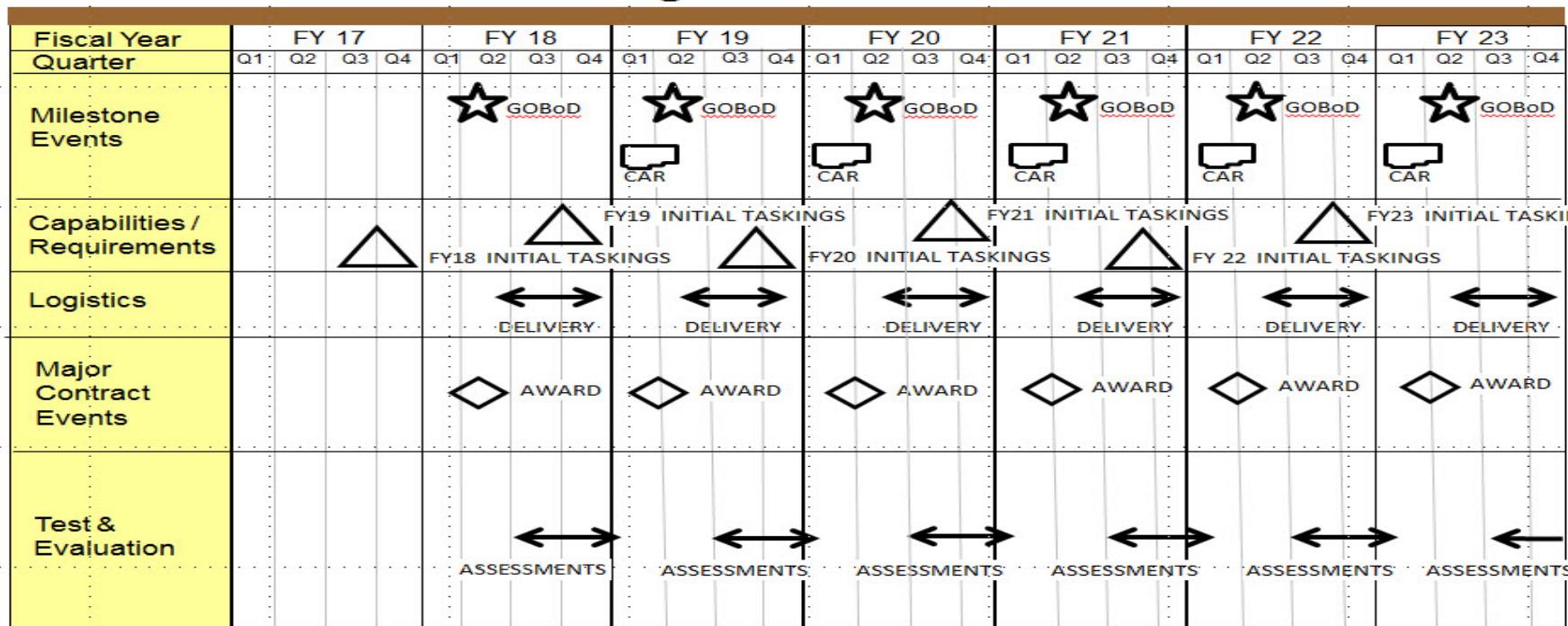
R-1 Program Element (Number/Name)

PE 0604320M / Rapid Technology
Capability Prototype

Project (Number/Name)

0386 / Rapid Prototype Development,
Marine Corps

RAPID PROTOTYPE DEVELOPMENT, MARINE CORPS
(Marine Corps Rapid Capabilities Office)
Program Schedule



ACRONYMS

CAR – Capability Assessment Report
GOBoD – General Officer Board of Directors
EMS – Electromagnetic Spectrum

KEY

★ GOBoD Decision
△ Key Event
■ Documentéation
↓ Assessments
◆ Contract Action

FY 18 PROJECTS

Tactical EMS Operations
Autonomous Unmanned Swarming
Long-Range Precision Fires

FY 19 PROJECTS

Autonomous Vehicles
Tactical Information Warfare
Urban Engagement Systems

FY 20–23 PROJECTS

TBD

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604320M / <i>Rapid Technology Capability Prototype</i> Project (Number/Name) 0386 / <i>Rapid Prototype Development, Marine Corps</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0386				
Contract Award	2	2019	2	2019
Prototype Deliveries	2	2019	4	2019
Operations Forces (OPFOR) Assessments	2	2019	1	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604454N I (U)LX (R)								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	105.914	24.730	9.578	5.549	-	5.549	12.694	12.530	3.240	3.313	Continuing	Continuing	
2474: LX(R) Design & Total Ship Integration	77.914	6.354	9.578	5.549	-	5.549	12.694	12.530	3.240	3.313	Continuing	Continuing	
9999: Congressional Adds	28.000	18.376	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	46.376	

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): P461

A. Mission Description and Budget Item Justification

The FY 2019 funding request was reduced by \$0.012 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

2474 - LX(R) is expected to functionally replace LSD-41 Class ships and LSD-49 Class ships for embark, transport, control, insert, sustainment, and extract of Marine Air-Ground Task Force elements and supporting forces by helicopters, landing craft, and amphibious vehicles. Efforts are required to identify viable alternatives, including examining a reduced cost variant of LPD-17 Class. Efforts include Gate and Milestone (MS) reviews/documentation, Capability Development Document (CDD), Indicative/Preliminary/Contract Design (ID/PD/CD), and development of logistics and Test & Evaluation documentation. Program is on track to support FY26 retirement of LSDs.

FY12-FY14 LX(R) efforts previously budgeted in PE 0603564N.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	6.354	9.578	5.657	-	5.657
Current President's Budget	24.730	9.578	5.549	-	5.549
Total Adjustments	18.376	0.000	-0.108	-	-0.108
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.624	0.000			
• Program Adjustments	0.000	0.000	-0.012	-	-0.012
• Rate/Misc Adjustments	0.000	0.000	-0.096	-	-0.096

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)	
• Congressional Add Adjustments	19.000	-
Congressional Add Details (\$ in Millions, and Includes General Reductions)		
Project: 9999: <i>Congressional Adds</i>		
Congressional Add: <i>Accelerate LX(R)</i>		
	Congressional Add Subtotals for Project: 9999	
	Congressional Add Totals for all Projects	
		FY 2017
		18.376
		FY 2018
		0.000
		18.376
		0.000
		18.376
		0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604454N I (U)LX (R)				Project (Number/Name) 2474 I LX(R) Design & Total Ship Integration				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2474: LX(R) Design & Total Ship Integration	77.914	6.354	9.578	5.549	-	5.549	12.694	12.530	3.240	3.313	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: P461												

A. Mission Description and Budget Item Justification

2474 - LX(R) is expected to functionally replace LSD-41 Class ships and LSD-49 Class ships for embark, transport, control, insert, sustainment, and extract of Marine Air-Ground Task Force elements and supporting forces by helicopters, landing craft, and amphibious vehicles. Efforts are required to identify viable alternatives, including examining a reduced cost variant of LPD-17 Class. Efforts include Gate and Milestone (MS) reviews/documentation, Capability Development Document (CDD), Indicative/Preliminary/Contract Design (ID/PD/CD), and development of logistics and Test & Evaluation documentation. Program is on track to support FY26 retirement of LSDs.

FY12-FY14 LX(R) efforts previously budgeted in PE 0603564N.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: LX(R) DESIGN/TOTAL SHIP INTEGRATION	6.354	9.578	5.549	0.000	5.549
Articles:	-	-	-	-	-
FY 2018 Plans: Continue affordability initiatives to identify additional savings to absorb the one year delay to Start of Construction. Complete, lock and approve a Technical Data Package that aligns with the established affordability targets. Develop the documentation for a Gate 5 Review to approve and release Detailed Design and Construction (DD&C) Request for Proposal (RFP). Finalize and issue TEMP for review and approval.					
FY 2019 Base Plans: Execute a Gate 5 Review to approve the release of the Detailed Design and Construction (DD&C) Request for Proposal (RFP). Release the RFP for DD&C with multiple follow ship contract options with an award value of more than \$8 Billion. Analyze and respond to numerous shipbuilder bidders questions and conduct source selection activities to support a FY20 contract award. Conduct a peer review and conduct a program review decision meeting with the Milestone Decision Authority in support of contract award.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018								
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)				Project (Number/Name) 2474 / LX(R) Design & Total Ship Integration										
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Decrease of \$4.029M from FY 2018 to FY 2019 is due to the shift in focus from affordability studies and Technical Data Package(TDP) development to the release of the DD&C RFP																		
Accomplishments/Planned Programs Subtotals										6.354	9.578	5.549	0.000	5.549				
C. Other Program Funding Summary (\$ in Millions)																		
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost							
• 3010: AMPHIBIOUS SHIP REPLACEMENT LX(R)	0.000	0.000	0.000	-	0.000	1,838.492	0.000	1,704.481	1,738.892	0.000	5,281.865							
Remarks																		
D. Acquisition Strategy Predecisional, competition will be part of the acquisition strategy.																		
E. Performance Metrics Performance metrics are included in the CDD.																		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604454N I (U)LX (R)					Project (Number/Name) 2474 I LX(R) Design & Total Ship Integration					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Design/Systems Integration	C/CPIF	CSC, Alion, ICI : Washington, DC	24.562	1.361	Dec 2016	3.144	Jan 2018	1.847	Nov 2018	-		1.847	Continuing	Continuing	Continuing
Design/Systems Integration	WR	NSWC Carderock/ SSES Philadelphia : NSWC Beth, MD/ SSES Philadelphia, PA	15.047	3.475	Nov 2016	3.078	Jan 2018	1.809	Oct 2018	-		1.809	Continuing	Continuing	Continuing
Design/Systems Integration	WR	NSWC Dahlgren : Dahlgren, VA	1.712	0.165	Nov 2016	0.707	Jan 2018	0.415	Oct 2018	-		0.415	Continuing	Continuing	Continuing
Design/Systems Integration	WR	PEO C4I, PEO IWS : Washington, DC	4.450	0.244	Nov 2016	1.670	Jan 2018	0.982	Oct 2018	-		0.982	Continuing	Continuing	Continuing
Design/Systems Integration	WR	NAWC Lakehurst : Lakehurst, NJ	0.899	0.298	Nov 2016	0.404	Jan 2018	0.193	Oct 2018	-		0.193	Continuing	Continuing	Continuing
Design/Systems Integration	C/BA	NSWC, Panama City : Panama City, FL	0.725	0.125	Nov 2016	0.275	Jan 2018	0.000		-		0.000	0.000	1.125	-
Design/Systems Integration	WR	NSWC, Port Hueneme : Port Hueneme, CA	0.628	0.220	Nov 2016	0.300	Jan 2018	0.122	Oct 2018	-		0.122	Continuing	Continuing	Continuing
Design/Systems Integration	C/CPFF	HII, General Dynamics : Various	29.891	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Design/Systems Integration	WR	NAVSEALOGCEN : Mechanicsburg, PA	0.000	0.466	Dec 2016	0.000		0.181	Oct 2018	-		0.181	0.000	0.647	-
Subtotal			77.914	6.354		9.578		5.549		-		5.549	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			77.914	6.354		9.578		5.549		-		5.549	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0604454N / (U)LX (R)

Project (Number/Name)

2474 / LX(R) Design & Total Ship Integration

Fiscal Year	2017				2018				2019				2020				2021				2022				2023				
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Capabilities Development Documentation (CDD)																													
Acquisition Milestones																													
Indicative/Preliminary Design/Contract Design																													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)	Project (Number/Name) 2474 / LX(R) Design & Total Ship Integration

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2474				
Capabilities Development Documentation (CDD)	1	2017	1	2017
Indicative/Preliminary Design/Contract Design	1	2017	3	2017
Gate 5	1	2019	1	2019
RFP Release Decision Point	1	2019	1	2019
Lead Ship Detail Design & Construction Award	1	2020	1	2020
Lead Ship Start of Construction	4	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)				Project (Number/Name) 9999 / Congressional Adds				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9999: Congressional Adds	28.000	18.376	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	46.376	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification													
FY17 Congressional Add to accelerate LX(R)													
B. Accomplishments/Planned Programs (\$ in Millions)											FY 2017	FY 2018	
Congressional Add: Accelerate LX(R)											18.376	0.000	
FY 2017 Accomplishments: The Capabilities Development Document (CDD) was approved by the Joint Requirements Oversight Council (JROC) in early FY 2017, which has further informed the development of the ship specification. Continue and complete Contract Design, which requires subsystem level of detail and most significantly a design that supports the development of a specification/documentation for a Gate 4, Gate 5 and Requirement Decision Point. Began early Operational Assessment discussions and development of a draft Test and Evaluation Master Plan(TEMP).													
FY 2018 Plans: N/A													
Congressional Adds Subtotals											18.376	0.000	
C. Other Program Funding Summary (\$ in Millions)													
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
• 3010: AMPHIBIOUS SHIP REPLACEMENT LX(R)	0.000	0.000	0.000	-	0.000	1,838.492	0.000	1,704.481	1,738.892	0.000	5,281.865		
Remarks													
D. Acquisition Strategy													
Predecisional, competition will be part of the acquisition strategy.													
E. Performance Metrics													
Predecisional, performance metrics will be developed in parallel with the CDD.													

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy													Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)					Project (Number/Name) 9999 / Congressional Adds					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Design/Systems Integration	C/CPIF	CSC, Alion, ICI : Washington, DC	0.444	6.920	Aug 2017	0.000		0.000		-		0.000	0.000	7.364	-
Design/Systems Integration	WR	NSWC Carderock/ SSES Philadelphia : Bethesda, MD/ Philadelphia, PA	3.400	7.262	Jul 2017	0.000		0.000		-		0.000	0.000	10.662	-
Design/Systems Integration	WR	NSWC, Dahlgren : Dahlgren, VA	0.000	1.100	Jul 2017	0.000		0.000		-		0.000	0.000	1.100	-
Design/Systems Integration	WR	PEO C4I, PEO IWS : Washington, DC	0.767	1.353	Jul 2017	0.000		0.000		-		0.000	0.000	2.120	-
Design/Systems Integration	WR	NAWC Lakehurst : Lakehurst, NJ	0.100	0.154	Jul 2017	0.000		0.000		-		0.000	0.000	0.254	-
Design/Systems Integration	C/CPFF	HII, General Dynamics : Various	23.047	1.094	Aug 2017	0.000		0.000		-		0.000	0.000	24.141	-
Design/Systems Integration	WR	NAVSEALOGCEN : Mechanicsburg, PA	0.242	0.325	Jul 2017	0.000		0.000		-		0.000	0.000	0.567	-
Design/Systems Integration	WR	NSWC Port Hueneme : Port Hueneme, CA	0.000	0.168	Jul 2017	0.000		0.000		-		0.000	0.000	0.168	-
Subtotal		28.000	18.376		0.000		0.000		-		0.000	0.000	46.376	N/A	
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			28.000	18.376		0.000		0.000		-		0.000	0.000	46.376	N/A

Remarks

FY 2017 funding is to address Congressional Intent for acceleration efforts

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy														Date: February 2018							
Appropriation/Budget Activity 1319 / 4							R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)				Project (Number/Name) 9999 / Congressional Adds										
Fiscal Year	2017			2018			2019			2020			2021			2022			2023		
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Capabilities Development Documentation (CDD)																					
Acquisition Milestones									▲ Gate 5 RFP				Lead Ship Detail Design & Const. Award		Start of Const.						
Indicative/Preliminary Design/Contract Design				CD																	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604454N / (U)LX (R)	Project (Number/Name) 9999 / Congressional Adds		
Schedule Details				
Events by Sub Project		Start	End	
		Quarter	Year	Quarter
Proj 9999				
Capabilities Development Documentation (CDD)		1	2017	1
Indicative/Preliminary Design/Contract Design		1	2017	3
Gate 5		1	2019	1
RFP Release Decision Point		1	2019	1
Lead Ship Detail Design & Construction Award		1	2020	1
Lead Ship Start of Construction		4	2021	4

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018					
Appropriation/Budget Activity					R-1 Program Element (Number/Name)											
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604536N / (U)Advanced Undersea Prototyping											
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
Total Program Element	0.000	57.363	66.543	87.669	-	87.669	95.267	85.413	40.085	33.686	Continuing	Continuing				
3393: Adv Undersea Prototyping-Remote Command & Control	0.000	1.486	2.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.486				
3394: Adv Undersea Prototyping-Vehicles, Propulsion & Navigation	0.000	38.789	61.512	87.669	-	87.669	95.267	85.413	40.085	33.686	Continuing	Continuing				
3395: Adv Undersea Prototyping-Explosive Payloads	0.000	1.220	2.014	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.234				
3396: Adv Undersea Prototyping-Non-Lethal Payloads	0.000	0.500	1.017	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.517				
9999: Congressional Adds	0.000	15.368	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.368				

Note

FY 2019 and future funding for Projects 3393, 3395 and 3396 are in Program Element (PE) 0604029N. These three projects realigned from PE 0604536N starting in FY 2019 included \$4.385 million reduction to account for the availability of prior year execution balances.

The current FY 2019 funding request for project 3394 was reduced by \$3.775 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

In order to accelerate future capability and support steady growth of the fleet's Unmanned Undersea Vehicle (UUV) Family of Systems (FoS), advanced undersea prototyping efforts include development, fabrication and test of the ORCA Extra Large Unmanned Undersea Vehicles (XLUUVs) and associated UUV technologies and will advance the development of unmanned undersea vehicles systems by leveraging ONR and Industry UUV efforts for larger diameter vehicles and associated technologies. Payloads will be customized to meet Navy needs and demonstrate useful capability for the fleet. The program intends to utilize fleet demonstrations of existing XLUUVs to rapidly and affordably capture tactics, techniques, and procedures in operating XLUUVs prior to delivery of the initial XLUUV vehicles to the fleet. This will help develop experience and demonstrate launch, communications, command and control, navigation, endurance, recovery, payload feasibility, and mission planning and execution for XLUUVs. XLUUV energy prototyping will leverage existing independent research and development in energy-dense technology that could meet power requirements for future XLUUV missions that are limited by the amount of power currently available. Efforts include research, development, test, and evaluation of advanced development model energy solutions applicable to XLUUVs for increased energy endurance and efficiency to extend the reach of unmanned undersea systems. The Common Control/Autonomy efforts will include risk reduction and developmental efforts of autonomy systems and architectures to work to develop common standards, interfaces, and systems to support cross-domain applications. The payloads efforts will include investigation, experimentation, demonstration, development and integration of lethal and non-lethal payloads, as applicable.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018			
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0604536N I (U)Advanced Undersea Prototyping			
Beginning in FY19, this PE will only focus on the XLUUV Class of vehicles since the core technologies efforts were moved to PE 0604029N starting in FY19.					
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	78.589	66.543	106.568	-	106.568
Current President's Budget	57.363	66.543	87.669	-	87.669
Total Adjustments	-21.226	0.000	-18.899	-	-18.899
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.115	0.000			
• Program Adjustments	0.000	0.000	-9.755	-	-9.755
• Rate/Misc Adjustments	-0.001	0.000	-9.144	-	-9.144
• Congressional Directed Reductions	-35.000	-	-	-	-
Adjustments					
• Congressional Add Adjustments	15.890	-	-	-	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0604536N I (U)Advanced Undersea Prototyping	
Technical: Not applicable.		
Schedule: Not applicable.		

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0604536N / (U)Advanced Undersea Prototyping				3393 / Adv Undersea Prototyping-Remote Command & Control				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3393: Adv Undersea Prototyping-Remote Command & Control	0.000	1.486	2.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.486	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N. Project realigned from PE 0604536N starting in FY 2019.

A. Mission Description and Budget Item Justification

Advanced Undersea energy efforts will leverage existing independent research and development in energy-dense technology that could meet power requirements for Unmanned Undersea Vehicle (UUV) missions, which are limited by the amount of power that they can carry. Efforts under this program element include research, development, test, and evaluation

of advanced energy solutions initially applicable to XLUUVs for increased energy endurance and efficiency to extend the reach of unmanned undersea systems. The Common Control/Autonomy portion of this project funds risk reduction and developmental efforts of autonomy systems and architectures to work to develop common standards, interfaces,

and systems to support cross-domain applications. This includes advanced development prototyping and demonstrations to accelerate the design and development of commonality and interoperability capabilities for the cross-domain (Surface and Sub-Surface, Aviation and Ground) requirements of the Navy. Coordinating with the Common Control System where

applicable, these efforts will demonstrate scalable, adaptable and interoperable warfighting capabilities across various unmanned systems. The advanced development emphasis will be to encourage innovation and enable rapid integration of UxS capabilities across domains while working to develop common standards, interfaces, and systems. These efforts will define, develop and demonstrate capability that advance new technology, hardware and software of Control Systems that could be used to operate multiple and dissimilar Naval UxSs. Supports Advanced Development and Prototyping of PE 0305205N: UAS Integration and Interoperability.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Product Development	1.300	1.460	0.000	0.000	0.000
FY 2018 Plans: Energy: Perform systems engineering and begin design of energy prototype components that leverage existing independent research and development in energy-dense technology to meet power requirements for XLUUV missions. Continue early					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
component and Advanced Development Model system prototype development. Conduct Preliminary Design Review (PDR).						
Autonomy: Continue requirements development and development of Architecture Standards. Continue early efforts for Total Common Control System (CCS).						
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604029N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604029N from PE 0604536N starting in FY 2019.						
Title: Support		Articles: 0.093	Articles: 0.390	Articles: 0.000	Articles: 0.000	Articles: 0.000
FY 2018 Plans: Energy: Update program documentation as required and support efforts. Autonomy: Update documentation and work on development of common autonomy standards, interfaces, and systems. Update CCS documentation based on domain requirements analyses.		-	-	-	-	-
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604029N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604029N from PE 0604536N starting in FY 2019.						
Title: Management		Articles: 0.093	Articles: 0.150	Articles: 0.000	Articles: 0.000	Articles: 0.000
FY 2018 Plans: Energy: Provide guidance, project planning, financial and contracting support, and coordination between prototype		-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
developer, test support, engineering, and contractors. Autonomy: Provide guidance, project planning, financial and contracting support, and coordination for development of common autonomy standards, interfaces, and systems, and common control efforts.				FY 2019 OCO
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604029N.				FY 2019 Total
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604029N from PE 0604536N starting in FY 2019.				
Accomplishments/Planned Programs Subtotals		1.486	2.000	0.000
C. Other Program Funding Summary (\$ in Millions)		0.000	0.000	0.000
N/A				
Remarks				
D. Acquisition Strategy Design Advanced Energy components to reach Preliminary Design Review in FY18. Develop and build advanced energy prototype and integrate system when ready. Test advanced energy prototype starting in FY21. Develop requirements, standards, interfaces, and architecture for Autonomy and Common Control System (CCS) unmanned system software components to support common prototyping and experimentation. Design and develop CCS unmanned system software components for common cross domain prototyping and system integration with surrogate systems starting in FY22. Coordination with UxS platforms will eliminate redundant efforts, encourage innovation, and improve coordination of unmanned systems across multiple domains. Schedules were updated to align with updated funding profiles. Leveraging the available applicable portions of the Common Control System (CCS) capabilities and products, the effort will work to reduce risk with advanced development efforts across Naval operating domains. The advanced energy efforts will leverage resources and prototype expertise to encourage industry innovation and allow for rapid integration into unmanned systems. Coordinate with other UxS Programs and Systems on the development of UUV autonomy standards, architectures, and systems, defining and focusing autonomy efforts. Develop algorithms and models and simulations for testing autonomy that could be inserted into UUVs.				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control
E. Performance Metrics Demonstrate use of advanced UUV Energy technology in an Advanced Development Model prototype. Demonstrate CCS & autonomy software through surrogate systems.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping						Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control			
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Contract	SS/CPFF	ARL PSU : State College, PA	0.000	0.600	Jul 2017	0.677	Jan 2018	0.000		-		0.000	0.000	1.277	Continuing
Common Control System (CCS) Cross-Domain Architecture Development	Various	Various : Various	0.000	0.200	Jul 2017	0.370	Jan 2018	0.000		-		0.000	0.000	0.570	Continuing
Autonomy	Various	Various : Various	0.000	0.500	Jul 2017	0.413	Dec 2017	0.000		-		0.000	0.000	0.913	Continuing
Subtotal			0.000	1.300		1.460		0.000		-		0.000	0.000	2.760	N/A
Remarks FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N.															
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Engineering Support 1	SS/CPFF	ARL PSU : State College, PA	0.000	0.035	Aug 2017	0.152	Jan 2018	0.000		-		0.000	0.000	0.187	Continuing
Auontomy Support	Various	NAVSEA Activities : Washington, DC	0.000	0.020	Jul 2017	0.135	Dec 2017	0.000		-		0.000	0.000	0.155	Continuing
Common Control System (CCS) Engineering Support	Various	Various : Various	0.000	0.038	Jul 2017	0.103	Dec 2017	0.000		-		0.000	0.000	0.141	Continuing
Subtotal			0.000	0.093		0.390		0.000		-		0.000	0.000	0.483	N/A
Remarks FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping				Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Prototype Management	Various	Various : Various	0.000	0.035	Jul 2017	0.050	Dec 2017	0.000		-		0.000	0.000	0.085	Continuing
Autonomy	Various	NAVSEA Activities : Washington, DC	0.000	0.020	Jul 2017	0.050	Dec 2017	0.000		-		0.000	0.000	0.070	Continuing
Common Control System (CCS)	Various	NAVAIR : Pax River, MD	0.000	0.038	Jul 2017	0.050	Feb 2018	0.000		-		0.000	0.000	0.088	Continuing
Subtotal			0.000	0.093		0.150		0.000		-		0.000	0.000	0.243	N/A
Remarks															
FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N.															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	1.486		2.000		0.000		-		0.000	0.000	3.486	N/A
Remarks															
FY 2019 and future funding for Project 3393 is in Program Element (PE) 0604029N.															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018											
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)												
1319 / 4								PE 0604536N / (U)Advanced Undersea Prototyping								3393 / Adv Undersea Prototyping-Remote Command & Control												
AUP Reomote Command & Control	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
Project Moved to Program Element 0604029	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Energy Prototype Development	Component Design and System Integration				Component Design & Integration				PDR				Requirements Development				Specification Development											
Component Design and System Integration																												
Preliminary Design Review (PDR)																												
Command & Control/Autonomy Advanced Development	Requirements Development				Specification Development																							
Requirements Development																												
Specification Development																												

2019PB - 0604536N - 3393

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3393 / Adv Undersea Prototyping-Remote Command & Control

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AUP Reomote Command & Control				
Project Moved to Program Element 0604029: Schedule Detail	1	2019	1	2019
Energy Prototype Development: Component Design and System Integration: Component Design and System Integration	4	2017	4	2018
Energy Prototype Development: Preliminary Design Review (PDR): Preliminary Design Reveiw (PDR)	4	2018	4	2018
Command & Control/Autonomy Advanced Development: Requirements Development: Requirements Development	4	2017	4	2018
Command & Control/Autonomy Advanced Development: Specification Development: Specification Development	4	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)						
1319 / 4					PE 0604536N / (U)Advanced Undersea Prototyping				3394 / Adv Undersea Prototyping-Vehicles, Propulsion & Navigation						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
3394: Adv Undersea Prototyping-Vehicles, Propulsion & Navigation	0.000	38.789	61.512	87.669	-	87.669	95.267	85.413	40.085	33.686	Continuing	Continuing			
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-					
Note															
The FY 2019 funding request was reduced by \$3.775 million to account for the availability of prior year execution balances															
A. Mission Description and Budget Item Justification															
Advanced undersea prototyping efforts include development, fabrication and test of ORCA Extra Large Unmanned Undersea Vehicle Systems (XLUUVs) and will advance the development of unmanned undersea vehicles by leveraging Commercial Off The Shelf (COTS) XLUUVs (normally greater than 54 inches in diameter). Payloads will be customized to meet Navy needs and demonstrate useful capability for the fleet. The program will utilize fleet demonstrations of existing XLUUVs to rapidly and affordably capture tactics, techniques, and procedures in operating XLUUVs prior to delivery of the initial XLUUV vehicles to the fleet. This will help develop experience and demonstrate launch, communications, command and control, navigation, endurance, recovery, payload feasibility, and mission planning and execution for XLUUVs.															
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: XLUUV Product Development Description: ORCA XLUUV is being developed via a full and open competition to two industry teams to design systems (with down select to one team to fabricate). FY 2018 Plans: Execute two industry teams designing ORCA XLUUV, conduct System Requirements Review (SRR), Preliminary Design Review (PDR) and Critical Design Review preps. Lease Commercial Off the Shelf (COTS) UUVs to develop Tactics, Techniques and Procedures (TTPs). Order Long-lead material to support fabrication starting in FY19. FY 2019 Base Plans: Complete design efforts and conduct Critical Design Reviews (CDR) early in FY19 for both industry teams. Conduct down select to one industry partner (possibly keep both) and award contract for fabrication of up to											35.338	52.822	77.577	0.000	77.577
Articles:											-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0604536N / (U)Advanced Undersea Prototyping	3394 / Adv Undersea Prototyping-Vehicles, Propulsion & Navigation				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
five (5) XLUUVs. Begin XLUUV vehicle fabrication, including procurement of remaining materials (long lead materials previously procured in FY18) and initial assembly and integration of the first vehicles. Continue to lease Commercial Off the Shelf (COTS) UUVs to develop Tactics, Techniques and Procedures (TTPs).						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increase in funding supports commencing XLUUV system fabrication.						
Title: XLUUV Support	Articles:	2.623	4.860	6.110	0.000	6.110
FY 2018 Plans: Support management of up to two industry teams to design ORCA XLUUV. Support overseeing COTS leasing.		-	-	-	-	-
FY 2019 Base Plans: Support finishing design and conduct the down select source selection process to one team for fabrication of XLUUV vehicles. Support overseeing fabrication efforts. Support overseeing of COTS leasing.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increase in funding supports fabrication award and oversight.						
Title: XLUUV Management Services	Articles:	0.828	3.830	3.982	0.000	3.982
FY 2018 Plans: Provide technical guidance, project planning, program management and travel for XLUUV prototyping, financial and contracting support, and coordinate work with Fleet, test support, engineering support, and contractors.		-	-	-	-	-
FY 2019 Base Plans: Provide technical guidance, project planning, program management and travel for XLUUV prototyping, financial and contracting support, and coordinate work with Fleet, test support, engineering support, and contractors.						
FY 2019 OCO Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3394 / Adv Undersea Prototyping-Vehicles, Propulsion & Navigation	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 increase in funding supports fabrication award and oversight.				
Accomplishments/Planned Programs Subtotals				38.789 61.512 87.669 0.000 87.669
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy Up to five ORCA XLUUV systems will be designed and fabricated for demonstration and use in both CONUS and in the PACOM theater. Payloads developed under projects 3395 and 3396 will be integrated onto these vehicles to be included in fleet experimentation throughout the program to gain experience and develop CONOPS and TTPs. In addition, program will lease Commercial Off The Shelf (COTS) XLUUVs for initial fleet demonstrations in FY18 and FY19. Two design contracts for the XLUUV system were awarded in FY 2017 with the option to down select to one contractor for fabrication in 1QFY19. Initial long-lead material will be ordered in FY18.				
E. Performance Metrics Successfully demonstrate ORCA XLUUV with Fleet.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604536N I (U)Advanced Undersea Prototyping				Project (Number/Name) 3394 I Adv Undersea Prototyping-Vehicles, Propulsion & Navigation							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Payload Design documentation	C/CPIF	Various : Various	0.000	0.085	Jul 2017	2.440	Nov 2017	1.290	Nov 2018	-		1.290	Continuing	Continuing	Continuing
Design, Material, and Fabrication of up to 5 XLUUVs, including sub-systems	C/CPIF	Various : Various	0.000	35.253	Sep 2017	50.382	Jan 2018	76.287	Dec 2018	-		76.287	Continuing	Continuing	Continuing
Subtotal		0.000	35.338		52.822		77.577		-		77.577	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
RFP/PSPED Dev	SS/CPFF	APL/JHU : Laurel, MD	0.000	0.300	Aug 2017	0.000		0.000		-		0.000	0.000	0.300	-
Source Selection	WR	NSWC CD : Carderock, MD	0.000	1.090	Aug 2017	0.000		0.427	Nov 2018	-		0.427	Continuing	Continuing	Continuing
Source Selection	WR	SSC PAC : San Diego, CA	0.000	0.205	Aug 2017	0.000		0.312	Nov 2018	-		0.312	Continuing	Continuing	Continuing
Oversight of Efforts	Various	VAR : Various	0.000	1.028	Aug 2017	4.860	Mar 2018	5.371	Nov 2018	-		5.371	Continuing	Continuing	Continuing
Subtotal		0.000	2.623		4.860		6.110		-		6.110	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Mgmt & Technical Efforts	WR	NAVSEA Activities : WASHINGTON, D.C.	0.000	0.828	Jun 2017	3.830	Oct 2017	3.982	Nov 2018	-		3.982	Continuing	Continuing	Continuing
Subtotal		0.000	0.828		3.830		3.982		-		3.982	Continuing	Continuing	N/A	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping				Project (Number/Name) 3394 / Adv Undersea Prototyping-Vehicles, Propulsion & Navigation					
	Prior Years	FY 2017	FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	38.789	61.512		87.669		-		87.669	Continuing	Continuing	N/A
Remarks												

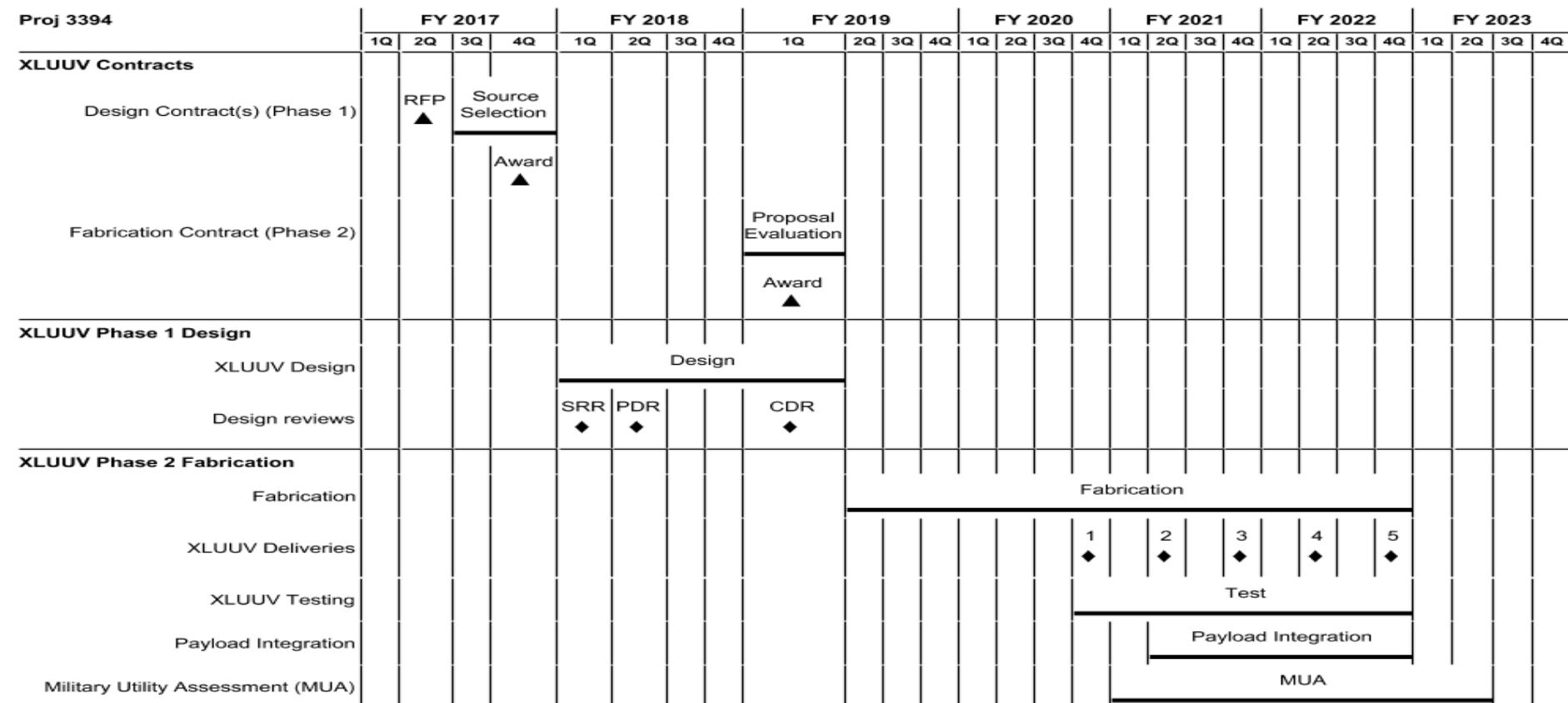
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604536N / (U)Advanced Undersea
Prototyping**Project (Number/Name)**3394 / Adv Undersea Prototyping-Vehicles,
Propulsion & Navigation

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3394 / Adv Undersea Prototyping-Vehicles, Propulsion & Navigation

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3394				
XLUUV Contracts: Design Contract(s) (Phase 1): RFP	2	2017	2	2017
XLUUV Contracts: Design Contract(s) (Phase 1): Source Selection	3	2017	4	2017
XLUUV Contracts: Design Contract(s) (Phase 1): Contract Award	4	2017	4	2017
XLUUV Contracts: Fabrication Contract (Phase 2): Proposal Evaluation	1	2019	1	2019
XLUUV Contracts: Fabrication Contract (Phase 2): Contract Award	1	2019	1	2019
XLUUV Phase 1 Design: XLUUV Design: Design	1	2018	1	2019
XLUUV Phase 1 Design: Design reviews: SRR	1	2018	1	2018
XLUUV Phase 1 Design: Design reviews: PDR	2	2018	2	2018
XLUUV Phase 1 Design: Design reviews: CDR	1	2019	1	2019
XLUUV Phase 2 Fabrication: Fabrication: Fabrication	2	2019	4	2022
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 1	4	2020	4	2020
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 2	2	2021	2	2021
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 3	4	2021	4	2021
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 4	2	2022	2	2022
XLUUV Phase 2 Fabrication: XLUUV Deliveries: Delivery System 5	4	2022	4	2022
XLUUV Phase 2 Fabrication: XLUUV Testing: Test	4	2020	4	2022
XLUUV Phase 2 Fabrication: Payload Integration: Integration	2	2021	4	2022
XLUUV Phase 2 Fabrication: Military Utility Assessment (MUA): Schedule Detail	1	2021	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0604536N / (U)Advanced Undersea Prototyping				3395 / Adv Undersea Prototyping-Explosive Payloads			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3395: Adv Undersea Prototyping-Explosive Payloads	0.000	1.220	2.014	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.234
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N. Project moved from PE 0604536N starting in FY 2019.

A. Mission Description and Budget Item Justification

Advanced undersea prototyping of undersea explosive payloads from XL sized UUVs. Leveraging the developments at ONR and other activities for undersea weapons, work to complete analysis of feasibility, policy, lethality, and performance of integrating undersea weapons systems on XLUUVs. The program will design new hardware, investigate and develop new interfaces/systems to increase lethality in both the undersea and surface targets. New C2 algorithms will be developed for advanced targeting.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Explosive Payloads	1.220	2.014	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2018 Plans: Conduct concept design for XLUUV undersea weapons payload and performance and lethality analysis. Begin development of XLUUV interfaces for undersea weapons payloads.					
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604029N.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Project moved from PE 0604536N starting in FY 2019.					
Accomplishments/Planned Programs Subtotals	1.220	2.014	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3395 / Adv Undersea Prototyping-Explosive Payloads
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy Leverage the knowledge base at the Naval Research and Development Enterprise to complete the feasibility studies that will then lead to the development of critical technology. The effort will heavily use the experience resident in the undersea weapons industrial base .		
E. Performance Metrics Successful launch of undersea weapons from an ORCA XLUUV.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping				Project (Number/Name) 3395 / Adv Undersea Prototyping-Explosive Payloads							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
XL Payload Interface Design & Fabrication	C/CPIF	TBD : TBD	0.000	0.741	Jun 2017	0.967	Mar 2018	0.000		-		0.000	0.000	1.708	-
COMMAND AND CONTROL	WR	TBD : TBD	0.000	0.100	Jul 2017	0.346	Jan 2018	0.000		-		0.000	0.000	0.446	-
Tech Support	C/CPFF	TBD : TBD	0.000	0.189	Jun 2017	0.234	Jan 2018	0.000		-		0.000	0.000	0.423	-
Management	WR	TBD : TBD	0.000	0.190	Jul 2017	0.137	Nov 2017	0.000		-		0.000	0.000	0.327	Continuing
Safety	WR	NSWC Indian Head : Indian Head, MD	0.000	0.000		0.330	Jan 2018	0.000		-		0.000	0.000	0.330	-
Subtotal			0.000	1.220		2.014		0.000		-		0.000	0.000	3.234	N/A
Remarks				FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N											
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	1.220		2.014		0.000		-		0.000	0.000	3.234	N/A
Remarks				FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N											

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																			Date: February 2018																
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)																			
1319 / 4								PE 0604536N / (U)Advanced Undersea Prototyping								3395 / Adv Undersea Prototyping-Explosive Payloads																			
Explosive Payloads	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023			1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
Project Moved to Program Element 0604029																																			
Lethal Payload Development																																			
CONOPS and Requirements Development																																			
XLUVV Interface Development																																			
Payload Design and Undersea Weapon Development																																			
2019PB - 0604536N - 3395																																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3395 / Adv Undersea Prototyping-Explosive Payloads

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Explosive Payloads				
Project Moved to Program Element 0604029: Schedule Detail	1	2019	1	2019
Lethal Payload Development: CONOPs and Requirements Development: CONOPs and Requirements	4	2017	4	2018
Lethal Payload Development: XLUUV Interface Development: Schedule Detail	3	2018	4	2018
Lethal Payload Development: Payload Design and Undersea Weapon Development: Phase A concept design- XL UUV Interface development	4	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018					
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping					Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost				
3396: Adv Undersea Prototyping-Non-Lethal Payloads	0.000	0.500	1.017	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.517				
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-					
Note																
FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N. Project moved from PE 0604536N starting in FY 2019.																
A. Mission Description and Budget Item Justification																
Advanced undersea prototyping will experiment and demonstrate non-lethal payloads on ORCA XLUUVs for use on ORCA XLUUV and other FoS UUVs. This effort will investigate the possibilities of employing non-lethal payloads from the XLUUV to support ISR and strike missions. Non-kinetic payloads provide the warfare commander an option to stop aggressive behavior without escalating the conflict. Non-lethal payloads that will be considered include jamming, EO/IR dazzling, microwave, aerial assets, and other methods.																
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)											FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
<i>Title:</i> Non Lethal Payloads											<i>Articles:</i>	0.500	1.017	0.000	0.000	0.000
<i>FY 2018 Plans:</i> Continue the initial technology study and conduct market analysis.												-	-	-	-	
<i>FY 2019 Base Plans:</i> FY 2019 funding in Program Element (PE) 0604029N.																
<i>FY 2019 OCO Plans:</i> N/A																
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Project moved from PE 0604536N starting in FY 2019.																
Accomplishments/Planned Programs Subtotals											0.500	1.017	0.000	0.000	0.000	
C. Other Program Funding Summary (\$ in Millions)																
N/A																
Remarks																

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads
D. Acquisition Strategy A technology study and market research will be completed in the first 12 months to examine the options available and the impact to the warfighter the different technology options bring. This will use a group of experts throughout the advanced undersea industry. Initial design efforts of a prototype system for the development of a non-kinetic payload will start in late FY18 for preliminary efforts with main efforts occurring after the study is completed. The payload will be integrated and demonstrated on the ORCA XLUUV.		
E. Performance Metrics Non-kinetic payload integrated onto an XLUUV. Detailed metrics are classified.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping						Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads			
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology study	Various	TBD : TBD	0.000	0.470	Aug 2017	0.000		0.000		-		0.000	0.000	0.470	-
Design, Material, & Fabrication Efforts	WR	TBD : TBD	0.000	0.000		0.842	Nov 2017	0.000		-		0.000	0.000	0.842	-
Subtotal			0.000	0.470		0.842		0.000		-		0.000	0.000	1.312	N/A
Remarks FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N															
Support (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DESIGN ANALYSIS	WR	NRL : WASHINGTON, D.C.	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Program Support	C/FFP	various : Arlington, VA	0.000	0.030	Jul 2017	0.175	Dec 2017	0.000		-		0.000	0.000	0.205	-
Subtotal			0.000	0.030		0.175		0.000		-		0.000	0.000	0.205	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.500		1.017		0.000		-		0.000	0.000	1.517	N/A
Remarks FY 2019 and future funding for project 3393 is in Program Element (PE) 0604029N															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0604536N | (U)Advanced Undersea
Prototyping

Project (Number/Name)

3396 | Adv Undersea Prototyping-Non-Lethal Payloads

2019PB - 0604536N - 3396

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 3396 / Adv Undersea Prototyping-Non-Lethal Payloads		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 3396</i>				
Non-Lethal Payload Development: Project Unit Moved to New Program Element 0603019N:		1	2019	1
Non-Lethal Payload Development: Technology Study:		4	2017	4
Non-Lethal Payload Development: Payload Design and Development:		4	2018	4
Non-Lethal Payload Development: ICD Development:		4	2018	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping				Project (Number/Name) 9999 / Congressional Adds				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
9999: Congressional Adds	0.000	15.368	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.368	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Undersea Warfighting Prototypes (AUWP) will experiment and develop prototype technologies in support of Navy mining initiatives to augment/inform a future mining program of record. Efforts include a prototype system to advance the capability for a submarine launched autonomous undersea vehicle capable of delivering clandestine delivered mines

(CDM)and Smart Mining Initiative (SMI) efforts including a Sea Floor Sensing System, a UUV Launched Unmanned Aerial Vehicle (UAV) Electro-Optical (EO) Discriminator, Remote Control Safe and Arm, and EO Safe and Arm. AUWP brings together a number of rapid prototyping, experimentation, and demonstration projects advancing key elements of common undersea warfare kill chains. Range, endurance and capacity demonstrations will deliver warfighting effects at range and from the sea floor in the face of the most challenging anti-access and area denial environments. The concept experiments with two different advanced sensing technical approaches from undersea; one on the sea floor and one from a UUV launched Unmanned Aerial Vehicle (UAV). These advance the targeting, discrimination, and recognition capabilities. Finally, experiments with remote control (arm/de-arm) of fusing systems for maritime smart mines will be conducted.

Updated program and schedule plan agreed upon by all stakeholders to use funds sharing between AUP lines and AUWP line C305.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018
Congressional Add: Program Increase	15.368	0.000
FY 2017 Accomplishments: Detailed design contract for MEDUSA system awarded to Hydroid in Nov 2017. SMI efforts commenced. Funding for AUWP received in late July 2017.		
MEDUSA Detailed design efforts run through 4QFY18 followed by system fabrication starting in 4QFY18. In FY 2019 complete MEDUSA fabrication, commence integration and test, and start TEMPALT development.		
Smart Mining Initiative (SMI) efforts will complete in late FY18 with a final demo in early FY19.		
FY 2018 Plans: N/A		
Congressional Adds Subtotals	15.368	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 9999 / Congressional Adds
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy Naval research and development activities, in conjunction with Industry partners, will design, develop, build, and demonstrate prototype technologies. This proposed course of prototyping informs requirements, assesses operational utility and mitigates cost, schedule and technical risks of future program actions to develop and deliver game changing advancements in the undersea domain.		
E. Performance Metrics Metrics include mobility, system range, persistence and survivability for undersea warfare missions.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping				Project (Number/Name) 9999 / Congressional Adds							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AUWP Development	WR	NSWC PC : Panama City, FL	0.000	4.800	Aug 2017	0.000		0.000		-		0.000	0.000	4.800	-
AUWP Development	WR	SSC PAC : San Diego, CA	0.000	2.300	Aug 2017	0.000		0.000		-		0.000	0.000	2.300	-
AUWP Development	WR	NSWC IH : Indian Head, MD	0.000	1.700	Aug 2017	0.000		0.000		-		0.000	0.000	1.700	-
AUWP Development	WR	NUWC N : Newport, Rhode Island	0.000	5.251	Aug 2017	0.000		0.000		-		0.000	0.000	5.251	-
AUWP Development	WR	NSWC CD : Bethesda, MD	0.000	0.325	Aug 2017	0.000		0.000		-		0.000	0.000	0.325	-
AUWP Development	WR	NRL : Washington, DC	0.000	0.500	Aug 2017	0.000		0.000		-		0.000	0.000	0.500	-
AUWP Development	Various	Various : Various	0.000	0.492	Sep 2017	0.000		0.000		-		0.000	0.000	0.492	-
Subtotal			0.000	15.368		0.000		0.000		-		0.000	0.000	15.368	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	15.368		0.000		0.000		-		0.000	0.000	15.368	N/A

Remarks

Funds shown above do not reflect agreed to funds sharing plan. Schedule shown next reflects actual plan.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018									
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)											
1319 / 4								PE 0604536N / (U)Advanced Undersea Prototyping								9999 / Congressional Adds											
AUWP				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
				1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
UUUV																											
	UUUV requirements and Concept Development																										
Sensors																											
	Prototype Sensor and Technology Design																										
	Prototype Fabrication																										
		Prototype Demonstration																									

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604536N / (U)Advanced Undersea Prototyping	Project (Number/Name) 9999 / Congressional Adds		
Schedule Details				
Events by Sub Project		Start	End	
AUWP		Quarter	Year	Quarter
UUV: UUV requirements and Concept Development:		4	2017	4
UUV: UUV Design, Fabrication, & Demo:		4	2018	2
Sensors: Prototype Sensor and Technology Design:		4	2017	2
Sensors: Prototype Fabrication:		2	2018	4
Sensors: Prototype Demonstration:		4	2018	1

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604659N I (U)Precision Strike Weapons Development Program								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	7.621	4.874	31.315	132.818	-	132.818	455.970	566.707	627.791	601.489	Continuing	Continuing	
3334: Conventional Prompt Strike (CPS)	0.000	0.000	0.000	15.000	-	15.000	290.373	374.579	478.377	482.745	Continuing	Continuing	
3378: Next Generation Land Attack Weapon (NGLAW)	7.621	4.874	9.994	16.866	-	16.866	49.288	91.658	109.844	112.035	Continuing	Continuing	
3407: Air Launched Decoy Development	0.000	0.000	21.321	100.952	-	100.952	116.309	100.470	39.570	6.709	Continuing	Continuing	

A. Mission Description and Budget Item Justification

Initial and continuing development of strike weapons consisting of armament, munitions, and weapon subsystems to allow for the horizontal integration among current and future weapon system capabilities to provide enhanced anti-surface and land strike capabilities in a demanding Anti-Access Area-Denial environment. This program provides for the development of weapon and weapon system technologies to address future requirements for enhanced and alternative weapon system capability requirements that include selectable output weapons, low collateral damage weapons, precision lethality weapons, area weapons, alternative warhead technology, Insensitive Munitions (IM), scaled munitions, Department of Defense (DoD) fuzing systems, sensors, extended range weapons and precision guided training round technology.

The Precision Strike Weapons Development Program Element supports the enhancement of Conventional Prompt Strike (CPS) war fighting capabilities. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. The development efforts could lead to a flight system that is non-ballistic over the majority of the flight path, controlled stage drop over Broad Ocean Area, positive control from launch to impact, adequate cross-range/maneuverability to avoid over flight issues, and effects on targets in a very short-period of time from execution order. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events. Prior to FY 2019, Conventional Prompt Strike efforts were solely funded through Defense Wide Research and Development funding. In FY 2019, CPS efforts in this project are to support Navy integration efforts, conduct trade studies of system alternatives and risk reduction technology maturation efforts as the CPS program begins to transition to Navy in FY 2020.

The Precision Strike Weapons Development Program Element (PE) supports the Next Generation Strike Capability (NGSC) by funding Next Generation Land Attack Weapon (NGLAW); a surface/submarine fired survivable, long range, multi-mission, multi-platform conventional strike capability fielding in the FY 2028 - FY 2030 timeframe. The Next Generation Strike Capability (NGSC) strategy will address future threats in time to replace or update legacy weapons while bringing next generation technology to Department of the Navy (DON) standoff conventional strike (Land Attack & ASuW). Within NGSC, NGLAW will be capable of attacking land and maritime, stationary and mobile targets while supporting two of the Navy's primary mission areas: 'Power Projection' (land attack from the sea/undersea) and 'Sea

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy			Date: February 2018							
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program									
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	Control' against enemy surface action groups/combatants. To the maximum extent possible, NGSC will utilize common components and component technologies (e.g. navigation; communications; seeker; guidance and control) across the air-launched and sea-launched missile variants to reduce cost, shorten development timelines, and promote interoperability.									
<p>The Precision Strike Weapons Development Program Element (PE) supports the air-launched electronic warfare (EW) systems capability; through the integration of a Navy variant of the Miniature Air Launched Decoy (MALD). EW is an integral war-fighting effect supporting combatant commander integrated priorities, as well as Joint or Coalition operations. EW systems influence, deceive, disrupt, degrade, deny and destroy threats throughout the electromagnetic spectrum to airborne and air-launched systems and their operations. EW includes air-launched electronic attack (EA) as well as elements of electronic support (ES) and electronic protection (EP). EA provides self-protection capabilities to other weapon systems through active and passive measures that deceive threats to airborne and air-launched systems and their operations by using kinetic and non-kinetic means to defeat threats that rely on the electromagnetic spectrum (Radio Frequency (RF), Electro-Optical (EO), Infrared (IR)). The ES capabilities support the collection, analysis, and dissemination of information related to the detection, geo-location, characterization, and identification of threats to airborne and air-launched systems and their operations. An air-launched EW system with stand-in capability increases the range and duration of EW systems while providing flexibility to commanders for employment.</p>										
<p>JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.</p>										
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget	9.910	31.315	118.830	-	118.830					
Current President's Budget	4.874	31.315	132.818	-	132.818					
Total Adjustments	-5.036	0.000	13.988	-	13.988					
• Congressional General Reductions	-	-								
• Congressional Directed Reductions	-	-								
• Congressional Rescissions	-	-								
• Congressional Adds	-	-								
• Congressional Directed Transfers	-	-								
• Reprogrammings	-	-								
• SBIR/STTR Transfer	-0.036	0.000								
• Rate/Misc Adjustments	0.000	0.000	13.988	-	13.988					
• Congressional Directed Reductions	-5.000	-	-	-	-					
Adjustments										
<u>Change Summary Explanation</u>										
Schedule: PU 3407										
FY 2019 will continue the MALD technical maturation effort and begin the EMD effort.										

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604659N / (U) <i>Precision Strike Weapons Development Program</i>
Schedule: PU 3378	
Analysis of alternatives (AoA) and Material Solution Analysis has been extended from 1Q FY 2017-2Q FY 2018 to 1Q FY 2017-4Q FY 2018 due to the physical and informational technology security processes needed to be executed for a study of this scope.	
The Technology Maturation and Risk Reduction (TMRR) phase moved from 2Q FY 2018 to 1Q FY 2019 due to extended AoA completion.	
Schedule: PU 3334	
The Convention Prompt Strike schedule has been added reflecting TMRR and Engineering Manufacturing and Development (EMD) associated with the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities.	
FY 2019 program increase of \$15.0M supports the Convention Prompt Strike program integration efforts.	
FY 2019 program decrease of \$1.0M due to inflation rate changes.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program				Project (Number/Name) 3334 I Conventional Prompt Strike (CPS)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3334: Conventional Prompt Strike (CPS)	0.000	0.000	0.000	15.000	-	15.000	290.373	374.579	478.377	482.745	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

The Precision Strike Weapons Development Program Element supports the enhancement of Conventional Prompt Strike (CPS) warfighting capabilities. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. The development efforts could lead to a flight system that is non-ballistic over the majority of the flight path, controlled stage drop over Broad Ocean Area, positive control from launch to impact, adequate cross-range/maneuverability to avoid overflight issues, and effects on targets in a very short-period of time from execution order. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events. Prior to FY 2019, Conventional Prompt Strike efforts were solely funded through Defense Wide Research and Development funding. In FY 2019, CPS efforts in this project are to support Navy integration efforts, conduct trade studies of system alternatives and risk reduction technology maturation efforts as the CPS program begins to transition to Navy in FY 2020.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Conventional Prompt Strike (CPS)	0.000	0.000	15.000	0.000	15.000
Articles:	-	-	-	-	-
Description: The Precision Strike Weapons Development Program Element supports the enhancement of Conventional Prompt Strike (CPS) warfighting capabilities. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. The development efforts could lead to a flight system that is non-ballistic over the majority of the flight path, controlled stage drop over Broad Ocean Area, positive control from launch to impact, adequate cross-range/maneuverability to avoid overflight issues, and effects on targets in a very short-period of time from execution order. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events. Prior to FY 2019, Conventional Prompt Strike efforts					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program	Project (Number/Name) 3334 I Conventional Prompt Strike (CPS)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
were solely funded through Defense Wide Research and Development funding. In FY 2019, CPS efforts in this project are to support Navy integration efforts, conduct trade studies of system alternatives and risk reduction technology maturation efforts as the CPS program begins to transition to Navy in FY 2020.						
FY 2018 Plans: N/A						
FY 2019 Base Plans: (U) FY 2019 PLAN (U) (\$15.000M)						
FY 2019 efforts include: (U) Conduct trade studies of system alternatives. Evaluations to include: Architecture, Lethality, Survivability, Affordability, Maintainability, Facilitation needs, and others (U) Conduct risk reduction technology maturation efforts including: Common weapons launcher integration activity, shipboard/flight systems trade space evaluation and sensitivity analyses, communications analysis, CONOPs evaluations & recommendations, warhead advancements and dual/use capability, and a range of survivability technology advancements. (U) Support other integration activities as needed potentially for subsurface and/or surface ships (SSN, Virginia Payload Module, DDG) and other leading architectures						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Funding increased in FY 2019 for Conventional Prompt Strike program integration efforts (\$15M).						
Accomplishments/Planned Programs Subtotals		0.000	0.000	15.000	0.000	15.000
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program	Project (Number/Name) 3334 I Conventional Prompt Strike (CPS)
D. Acquisition Strategy The acquisition strategy will be influenced through the completion of trade studies of system alternatives and risk reduction technology maturation efforts through various contracts and warfare centers.		
E. Performance Metrics Program reviews and assessments of R&D testing results.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program						Project (Number/Name) 3334 I Conventional Prompt Strike (CPS)				
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Conventional Prompt Strike	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		14.500	Nov 2018	-		14.500	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		0.000		14.500		-		14.500	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Conventional Prompt Strike	TBD	TBD : TBD	0.000	0.000		0.000		0.500	Oct 2018	-		0.500	Continuing	Continuing	Continuing	
Subtotal			0.000	0.000		0.000		0.500		-		0.500	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		0.000		15.000		-		15.000	Continuing	Continuing	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program	Project (Number/Name) 3334 I Conventional Prompt Strike (CPS)	
Schedule Details			
Events by Sub Project	Start	End	
Proj 3334	Quarter	Year	Quarter
Project 3334: Technology Maturation and Risk Reduction	1	2019	3
Project 3334: Engineering and Manufacturing Development	4	2019	4
			2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)					
1319 / 4					PE 0604659N I (U)Precision Strike Weapons Development Program				3378 I Next Generation Land Attack Weapon (NGLAW)					
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
3378: Next Generation Land Attack Weapon (NGLAW)	7.621	4.874	9.994	16.866	-	16.866	49.288	91.658	109.844	112.035	Continuing	Continuing		
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-				
A. Mission Description and Budget Item Justification														
Funding is provided for the Next Generation Land Attack Weapon (NGLAW) that includes a survivable, long range, multi-mission, multi-platform (surface and subsurface) conventional strike capability in the FY 2028 - FY 2030 timeframe. NGLAW will address future threats while bringing ship/submarine Next Generation Strike Capability (NGSC) to Department of the Navy (DON) standoff conventional strike (land and maritime attack). NGLAW will be capable of attacking land and maritime, stationary and mobile targets while supporting two of the Navy's primary mission areas: 'Power Projection' (land attack from the sea/undersea) and 'Sea Control' against enemy surface action groups/combatants. To the maximum extent possible, the Navy will utilize common components and component technologies (e.g. navigation; communications; seeker; guidance and control) to reduce cost, shorten development timelines, and promote interoperability.														
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)														
Title: Next Generation Land Attack Weapon (NGLAW)										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Articles:										4.874	9.994	16.866	0.000	16.866
FY 2018 Plans: Continue NGLAW AoA assessing weapons systems, emergent technologies, and industry Internal Research and Development (IRAD) activities/proposals that can be used across multiple mission areas to reduce risk, development time, and cost. Complete threat assessments based on current and future scenarios and environments to inform performance requirements and relevant technology.										-	-	-	-	-
FY 2019 Base Plans: Commence the Technology Maturation and Risk Reduction (TMRR) Phase of the NGLAW program. Efforts include competitive prototyping of system elements, the refinement of requirements, and the development of functional and allocated baselines of the end-item system configuration for the follow-on long range cruise missile strike mission.														
FY 2019 efforts specifically include multiple contract awards associated with the prototyping of critical technologies identified during the Analysis of Alternatives to include engines, warhead, electronic warfare,														

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program	Project (Number/Name) 3378 I Next Generation Land Attack Weapon (NGLAW)	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
seekers/sensors, and airframe prototype designs to reduce technical risk, validate designs, validate cost estimates, evaluate manufacturing processes, and refine requirements.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: The increase in FY 2019 required to transition the NGLAW program from the Analysis of Alternatives (AoA) to the Technology Maturation and Risk Reduction (TMRR) phase.				
Accomplishments/Planned Programs Subtotals				
4.874				16.866
9.994				0.000
16.866				16.866
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy Acquisition strategy will be influenced by the output of the Analysis of Alternatives (AoA) and the Material Development Decision (MDD). Commencing in FY 2019, the NGLAW program will enter the Technology Maturation and Risk Reduction (TMRR) phase which will conduct competitive prototyping of system elements and refine requirements of the future long range cruise missile. The TMRR phase will decrease technical risk and develop a sufficient understanding of a solution in order to make sound business decisions on initiating a formal acquisition program in the Engineering, Manufacturing and Development (EMD) Phase.				
E. Performance Metrics Performance Metrics will be influenced by the output of the AoA.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program				Project (Number/Name) 3378 I Next Generation Land Attack Weapon (NGLAW)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
TMRR - Airframe	C/CPFF	TBD : TBD	0.000	0.000		0.000		2.573	Nov 2018	-		2.573	0.000	2.573	-
TMRR - Engines	C/CPFF	TBD : TBD	0.000	0.000		0.000		4.289	Nov 2018	-		4.289	0.000	4.289	-
TMRR - Seeker/Sensor	C/CPFF	TBD : TBD	0.000	0.000		0.000		3.431	Dec 2018	-		3.431	0.000	3.431	-
TMRR - Electronic Warfare	C/CPFF	TBD : TBD	0.000	0.000		0.000		1.715	Jan 2019	-		1.715	0.000	1.715	-
TMRR- Warhead	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.860	Nov 2018	-		0.860	0.000	0.860	-
Subtotal			0.000	0.000		0.000		12.868		-		12.868	0.000	12.868	N/A

Remarks

The FY 2019 airframe, engines seeker/sensor and electronic warfare contracts will be multiple competitive awards.

FY 2019 funding increases due to program transition from AoA phase to Technical Maturation Risk Reduction (TMRR) baseline assessment phase. TMRR will involve multiple contracts for subcomponent prototyping by industry vendors and multiple Statement's of Work (SOWs) for subcomponent prototyping by Government Field Activities, as determined by the AoA requirements.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NAWC-WD : China Lake, CA	0.150	2.300	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Development Support- AIR 4.0M	WR	NAWC-AD : Patuxent River, MD	1.314	1.800	Dec 2016	2.470	Nov 2017	0.988	Oct 2018	-		0.988	Continuing	Continuing	Continuing
Development Support	SS/CPFF	JHU/APL : Patuxent River, MD	2.050	0.774	Dec 2016	1.114	Nov 2017	0.445	Dec 2018	-		0.445	Continuing	Continuing	Continuing
Weapons Control System	WR	NSWC-DD : Dahlgren, VA	0.025	0.000		3.360	Nov 2017	1.344	Nov 2018	-		1.344	0.000	4.729	Continuing
Mission Planning System	WR	NAVAIR : Patuxent River, MD	0.000	0.000		3.050	Nov 2017	1.221	Nov 2018	-		1.221	0.000	4.271	Continuing
Development Support	WR	NSMA : JBAB, DC	3.488	0.000		0.000		0.000		-		0.000	0.000	3.488	Continuing
Development Support	MIPR	NRO : Chantilly, VA	0.569	0.000		0.000		0.000		-		0.000	0.000	0.569	Continuing
Development Support	WR	NSWC-NPT : Newport, RI	0.025	0.000		0.000		0.000		-		0.000	0.000	0.025	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program						Project (Number/Name) 3378 I Next Generation Land Attack Weapon (NGLAW)			
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost To Complete	
Subtotal		7.621	4.874			9.994		3.998		-		3.998	Continuing
Remarks Development Support - funding in FY 2019 required to support the commencement of the Technology Maturation and Risk Reduction Phase of the NGLAW program.													
				Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		7.621	4.874			9.994		16.866		-		16.866	Continuing
Remarks													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604659N I (U)Precision Strike
Weapons Development Program**Project (Number/Name)**3378 I Next Generation Land Attack
Weapon (NGLAW)

Next Generation Strike Weapon	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023						
	1Q	2Q	3Q	4Q																											
Acquisition Milestones																															
Milestones	AoA																														
Systems Development																															
Systems Development	MSA												TMRR																		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program	Project (Number/Name) 3378 I Next Generation Land Attack Weapon (NGLAW)		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
Next Generation Strike Weapon				
Acquisition Milestones: Milestones: Analysis of Alternatives		1	2017	4
Systems Development: Systems Development: Technology Maturation and Risk Reduction		1	2019	4
Systems Development: Systems Development: Material Solution Analysis		1	2017	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program					Project (Number/Name) 3407 I Air Launched Decoy Development			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
3407: Air Launched Decoy Development	0.000	0.000	21.321	100.952	-	100.952	116.309	100.470	39.570	6.709	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

This project develops a Navy variant of the Miniature Air Launched Decoy (MALD). The variant will address current and future advanced Integrated Air Defense System (IADS) threats by bringing an air-launched, stand-in EW capability to Department of the Navy (DON) suppression of enemy air defenses/destruction of enemy air defenses (SEAD/DEAD) and standoff conventional land strike. A Navy variant of MALD with stand-in capability increases the range and duration of EW systems while providing flexibility to commanders for employment. To the maximum extent possible, the Navy will utilize existing technology from the current MALD-J production line and other common components (e.g. navigation, communication, guidance and control, payload) to reduce cost, shorten development timelines and promote interoperability. OPNAV has written a draft CDD in preparation for entry into formal staffing in 4Q2017.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Miniature Air Launched Decoy (MALD)	0.000	21.321	100.952	0.000	100.952
Articles:	-	-	-	-	-
FY 2018 Plans: Begin technical maturation efforts. FY 2018 will transition MALD from a Strategic Capabilities Office (SCO) Demonstration to a Navy program of record. The Navy program builds upon the SCO demonstration, which allows the Navy to begin integration, development and mission planning activities in FY 2018. Tasks scheduled to begin in FY 2018 include but are not limited to: Aircraft Integration/Air Worthiness to include wind tunnel testing and fit checks specific to F/A-18 E/F; software development of a MALD mission planning module hosted into Joint Mission Planning System (JMPS) and a Navy MALD unique "Airborne Electronic Attack" planning module and material purchases to support developmental activities. Material purchases in FY 2018 support base plan activities. Long lead material procurements in FY 2018 support continued development and aircraft integration work and have an 18 month lead time for some AUR components and up to a 24 month lead time for Range Safety/Flight Termination Systems. Funding also provides for Engineering, Logistics and Program Management support. This is not a new start.					
FY 2019 Base Plans: Continue and complete technical maturation efforts. Begin Engineering, Manufacturing, and Development phase activities. FY 2019 builds upon the FY18 technical maturation effort, to take the program through SETR 2.0 and SETR 3.0, and begin planning for SETR 4.0. Component level development will continue into FY 2019, with					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program				Project (Number/Name) 3407 I Air Launched Decoy Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
power and distribution, airframe and container completing by the end of the FY. Tasks scheduled to continue in FY 2019 include but are not limited to: Aircraft Integration/ Air Worthiness to include wind tunnel testing and fit checks specific to F/A-18 E/F; software development of a MALD mission planning module hosted into Joint Mission Planning System (JMPS) and a Navy MALD unique "Airborne Electronic Attack" planning module and material purchases to support development activities. Material purchases in FY 2019 support development of test assets. Long Lead material procurements in FY 2019 support continued development and aircraft integration work and have an 18 month lead time for some AUR components and up to a 24 month lead time for Range Safety/Flight Termination Systems. Funding also provides for Engineering, Logistics and Program Management support.												
FY 2019 OCO Plans: N/A												
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2018 provided funding to begin tasks related to aircraft integration and air worthiness that includes wind tunnel testing specific to F/A-18 E/F. FY 2019 provides funding to begin design and development of the MALD-N, container re-design and procure long lead items required to build test assets. FY 2019 increase supports the commencement of engineering, manufacturing and development phase and award.												
Accomplishments/Planned Programs Subtotals						0.000	21.321	100.952	0.000	100.952		
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• 0204162N/2285: <i>Drones and Decoys</i>	0.000	0.000	0.000	-	0.000	0.000	61.291	84.166	133.728	0.000	279.185	
Remarks												
D. Acquisition Strategy Research and development performed by contractor and government staff.												
E. Performance Metrics Acquisition Strategy, Class Justification and Approval, Acquisition Plan.												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program				Project (Number/Name) 3407 I Air Launched Decoy Development								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Product Development	C/CPFF	TBD : TBD	0.000	0.000		14.315	Mar 2018	73.005	Jan 2019	-		73.005	Continuing	Continuing	Continuing	
		Subtotal	0.000	0.000		14.315		73.005		-		73.005	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Support	WR	NAWC AD : Patuxent River, MD	0.000	0.000		2.000	Oct 2017	10.204	Nov 2018	-		10.204	Continuing	Continuing	Continuing	
Government Support	WR	NAWC WD : China Lake, CA	0.000	0.000		4.000	Oct 2017	16.947	Nov 2018	-		16.947	Continuing	Continuing	Continuing	
		Subtotal	0.000	0.000		6.000		27.151		-		27.151	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Support	WR	NAWC AD : Patuxent River, MD	0.000	0.000		0.500	Oct 2017	0.333	Nov 2018	-		0.333	Continuing	Continuing	Continuing	
Government Support	WR	NAWC WD : China Lake, CA	0.000	0.000		0.256	Oct 2017	0.171	Nov 2018	-		0.171	Continuing	Continuing	Continuing	
Project Management Support	C/CPFF	NAWC AD : Patuxent River, MD	0.000	0.000		0.200	Mar 2018	0.212	Nov 2018	-		0.212	Continuing	Continuing	Continuing	
Travel	Various	NAVAIR : Patuxent River, MD	0.000	0.000		0.050	Oct 2017	0.080	Nov 2018	-		0.080	Continuing	Continuing	Continuing	
		Subtotal	0.000	0.000		1.006		0.796		-		0.796	Continuing	Continuing	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		21.321		100.952		-		100.952	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy							Date: February 2018					
Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)						
1319 / 4			PE 0604659N I (U)Precision Strike Weapons Development Program			3407 I Air Launched Decoy Development						
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Remarks												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																		Date: February 2018										
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)												
1319 / 4								PE 0604659N I (U)Precision Strike Weapons Development Program								3407 I Air Launched Decoy Development												
Miniature Air Launched Decoy				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				
				1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Product Development																												
	Contract Award							Technical Maturation							EMD													
Systems Development																												
	Systems Development														EMD													
Test and Evaluation															Developmental Testing													
2019PB - 0604659N - 3407																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604659N I (U)Precision Strike Weapons Development Program	Project (Number/Name) 3407 I Air Launched Decoy Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Miniature Air Launched Decoy				
Product Development: Contract Award: Technical Maturation Contract Award	2	2018	2	2018
Product Development: Contract Award: EMD Contract Award	2	2019	2	2019
Systems Development: Systems Development: Engineering and Manufacturing Development	1	2019	1	2021
Systems Development: Systems Development: Developmental Testing	1	2018	1	2021
Test and Evaluation: Operational Test	2	2021	1	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604707N / SEW Architecture/Eng Support								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	264.184	20.104	42.851	7.230	-	7.230	8.160	9.024	9.220	9.407	Continuing	Continuing	
0798: Allied/Coalition Interoperability and Information Dominance (ACIID)	32.608	0.943	1.096	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	34.647	
2144: Space & Elec Warfare Engineering	209.167	12.879	33.716	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	255.762	
2147: ISR Architecture	0.000	1.482	1.587	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.069	
2356: Maritime Concept Generation & Development	22.409	4.800	6.452	7.230	-	7.230	8.160	9.024	9.220	9.407	Continuing	Continuing	

Note

Beginning in FY19, Allied/Coalition Interoperability and Information Dominance (ACIID) (now called Allied/Coalition Maritime Environment (ACME)) Project 0798, Space & Electronic Warfare (SEW) Engineering Project 2144, and Intelligence, Surveillance, and Reconnaissance (ISR) Architecture Project 2147 were realigned from PE 0604707N SEW Architecture/ENG Support to PE 0606355N Warfare Innovation Management.

A. Mission Description and Budget Item Justification

The CGCD project (2356) focuses on the generation, development and validation of warfighting concepts, Concept of Operations (CONOPS) and doctrine in order to eliminate war fighting gaps. Naval Warfare Development Command (NWDC) also manages the Fleet Experimentation program (formerly Sea Trial). In FY2019 the project will execute a number of new experimentations in the areas of Electromagnetic Maneuver Warfare (EMW), Mine Warfare, Naval Integrated Fires, and Unmanned systems and conduct experiments (war simulations, Modeling & Simulation (M&S), at-sea events) to develop emerging Naval concepts.

The ACIID project (0798), now called ACME, promotes interoperability with allied and coalition forces by facilitating maritime interoperability in both processes and communication systems, including emerging capabilities, to counter growing high-end asymmetric threats.

The SEW Engineering project (2144) is a systems engineering non-acquisition program to develop, test, implement Technical Authority (TA) products, and validate Naval Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System architectures to support naval, Joint and Coalition missions across normal, contested, and degraded cyber/operational environments. The objective of this project is carried out by multiple tasks that ensure development and delivery of naval Information Warfare (IW) capabilities that are well-integrated, interoperable, secure, and resilient to meet validated warfighting requirements.

The Intelligence, Surveillance, and Reconnaissance (ISR) Architecture project (2147) is intended to guide system of systems capability development and promote interoperability across Navy ISR programs, as well as interoperability and alignment with Department of Defense (DoD)-wide enterprise initiatives including Joint

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018					
Appropriation/Budget Activity	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support									
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)										
Information Environment (JIE) and Intelligence Community (IC) Information Technology Environment (ITE). This effort to develop integrated ISR architectures will also help instill systems engineering discipline and standardization across the Navy ISR Enterprise and provide a means by which to assess ISR Program of Record (PoR) progress in conforming to a single Navy architecture.										
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget	23.971	42.851	32.518	-	32.518					
Current President's Budget	20.104	42.851	7.230	-	7.230					
Total Adjustments	-3.867	0.000	-25.288	-	-25.288					
• Congressional General Reductions	-	-								
• Congressional Directed Reductions	-	-								
• Congressional Rescissions	-	-								
• Congressional Adds	-	-								
• Congressional Directed Transfers	-	-								
• Reprogrammings	-	-								
• SBIR/STTR Transfer	-0.504	0.000								
• Program Adjustments	0.000	0.000	-25.189	-	-25.189					
• Rate/Misc Adjustments	0.000	0.000	-0.099	-	-0.099					
• Congressional General Reductions	-0.043	-	-	-	-					
Adjustments										
• Congressional Directed Reductions	-3.320	-	-	-	-					
Adjustments										

Change Summary Explanation

The FY 2019 funding request for project 2144 Space and Elec Warfare Engineering was reduced by \$2.222 million to account for the availability of prior year execution balances. This updated control is now reflected in under Program Element 0606355N WARFARE INNOVATION MANAGEMENT.

\$4.165 millions of FY19 funding was transferred from project 2144 Space and Elec Warfare Engineering for Risk management Framework.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0604707N / SEW Architecture/Eng Support				0798 / Allied/Coalition Interoperability and Information Dominance (ACIID)				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0798: <i>Allied/Coalition Interoperability and Information Dominance (ACIID)</i>	32.608	0.943	1.096	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	34.647	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

Note

Project title changed as follows: Allied/Coalition Maritime Environment (ACME) (Previously called Allied/Coalition Interoperability and Information Dominance (ACIID) in FY17 and prior.)

A. Mission Description and Budget Item Justification

The ACME program advances Information Warfare (IW) (to include Command, Control, Communications, Computers; Intelligence, Surveillance and Reconnaissance (C4ISR); Electronic Warfare (EW); and Cyber Warfare), interoperability with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO), and other Allied and Coalition partners. The program determines maritime operational gaps with our allies, identifies Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) solutions with the potential to fill those gaps, and assesses these solutions and associated concepts of operation in laboratory and at-sea environments. The ACME program includes integration and testing in support of joint and Allied war fighting capabilities, including interoperability testing of IW equipment. Allied and joint interoperability is critical for future maritime operations, especially as the United States Navy (USN) expands Internet Protocol (IP) networking throughout the fleet via Consolidated Afloat Networks and Enterprise Services (CANES), Next Generation Networks (NGEN), Mission Partner Environment/ Future Mission Networking (MPE/FMN), the U.S. Battlefield Information Collection and Exploitation System - eXtended (BICES-X), and with the Joint Information Environment (JIE).

Currently, IP connectivity with AUSCANNZUKUS and other Allied/Coalition forces is limited, requiring extensive backhaul through ashore infrastructure. Higher bandwidth solutions suitable for use over tactical networks require development and assessment for emerging coalition and joint interoperability requirements, such as Maritime Domain Awareness (MDA), Network Operations Without Shore (NOWS), Satellite Communications (SATCOM) Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operations, and to counter Anti-Access Area Denial (A2/AD) threats. Increases in data throughput are required for the effective exchange of rich IW data sets and services via Service Oriented Architectures (SOA) within the limitations of High Frequency (HF), Ultra-High Frequency (UHF), and other portions of the radio frequency spectrum, coupled with appropriate Information Assurance and Computer Network Defense (IA/CND) mechanisms. Development and assessment of potential solutions will integrate improved IP capabilities with the Advanced Digital Network Systems (ADNS) and existing international standards (e.g. Allied Communications Publication 200, NATO Standardization Agreements 5066 and 4691). The continued development and refinement of advanced tactical networking technologies and protocols, to include Low Probability of Intercept (LPI), Low Probability of Detection (LPD), and Anti-Jam (AJ) capabilities as well as Automatic Link Establishment (ALE) standards, will provide for a significant improvement in secure data sharing within, and between, coalition maritime elements.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
0.943	1.096	0.000	0.000	0.000

Title: Advanced Relay Capabilities

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0604707N / SEW Architecture/Eng Support	0798 / Allied/Coalition Interoperability and Information Dominance (ACIID)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
	<i>Articles:</i>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans:		-	-	-	-	-
- Develop and refine advanced tactical networking and communication capabilities that facilitate Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operations, including polar environments, which counter Anti-Access Area Denial (A2/AD) threats and promote Allied interoperability and task group-centric operations. Solutions will address higher bandwidth, Low Probability of Intercept (LPI)/Low Probability of Detection (LPD)/ Anti-Jam (AJ) technologies across the Radio Frequency (RF) and Optical spectrum and include airborne capabilities.						
- Continue to develop and assess secure and interoperable technologies and capabilities supporting DDIL operations, to include multibearer routing, distributed applications and services for Mission Partner Environment/Future Mission Networking (MPE/FMN), the use of cross-domain and data labeling solutions in maritime tactical networking environments and advanced Information Assurance and Computer Network Defense (IA/CND) solutions. The overarching goal is to maximize interoperability and network and application efficiency using multiple, dissimilar bearers and integrate these advanced solutions into an Allied/Coalition networking capability capable of DDIL operations, countering A2/AD threats and integrating with MPE/FMN architectures.						
- Continue to assess the U.S. Battlefield Information Collection and Exploitation System - extended (BICES-X) technologies and associated interoperability issues in DDIL environments.						
- Continue to increase Allied Information Warfare (IW) interoperability with other joint and maritime multi-national forums, such as the Combined Communications Electronic Board (CCEB), Multinational Maritime Information-system Interoperability Steering Group (M2I2), MPE/FMN and Joint Information Environment (JIE) forums.						
- Continue to assess and validate individual technologies, integrated solutions, and associated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) through experimentation, trials and demonstrations with Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS) and other Allied/Coalition partners during operational venues such as Rim of the Pacific (RIMPAC) or Joint Warrior.						
FY 2019 Base Plans:						
FY19 Allied/Coalition Maritime Environment (ACME) funding resides under PE 0606355N Warfare Innovation Management.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 0798 / Allied/Coalition Interoperability and Information Dominance (ACIID)	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
Beginning in FY19, the ACME funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N Warfare Innovation Management.				
	Accomplishments/Planned Programs Subtotals	0.943	1.096	0.000
		0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy Allied/Coalition Maritime Environment (ACME) is a non-acquisition program that promotes United States Navy interoperability with allied and coalition forces to achieve the Chief of Naval Operations (CNO) vision by facilitating maritime interoperability in both processes and communications systems, including emerging capabilities, to counter growing high-end asymmetric threats, and is a key enabler of the force multiplying benefits achieved through cooperation among the Australia, Canada, New Zealand, United Kingdom, United States (AUSCANNZUKUS), North Atlantic Treaty Organization (NATO), and other partner nations. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.				
E. Performance Metrics Advanced Relay Capabilities: The ACME program will employ laboratory testing and at-sea demonstrations to assess specific technologies, operational concepts, and integrated Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) solutions pertaining to Denied, Degraded, Intermittent and Low-bandwidth (DDIL) operational environments, Network Operations Without Shore (NOWS), Maritime Domain Awareness (MDA), Mission Partner Environment/ Future Mission Networking (MPE/FMN), Joint Information Environment (JIE), and other aspects of Information Warfare (IW). These assessments will report on identified capability gaps, link capability gaps to technology/DOTMLPF gaps, identify technologies and DOTMLPF solutions considered ready for deployment, transition to a program of record to enhance Fleet war fighting capability, and enhance Allied interoperability.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support					Project (Number/Name) 0798 / Allied/Coalition Interoperability and Information Dominance (ACIID)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Advanced Relay Capabilities	C/CPFF	SAIC : McLean, VA	0.000	0.110	Jan 2017	0.126	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing	
Subtotal			0.000	0.110		0.126		0.000		-		0.000	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Advanced Relay Capabilities	Various	Various : Various	31.131	0.117	Jan 2017	0.135	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing	
Advanced Relay Capabilities	WR	SSC PAC : San Diego	0.000	0.716	Jan 2017	0.835	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing	
Subtotal			31.131	0.833		0.970		0.000		-		0.000	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management Services	Various	Various : Various	1.477	0.000		0.000		0.000		-		0.000	0.000	1.477	-	
Subtotal			1.477	0.000		0.000		0.000		-		0.000	0.000	1.477	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			32.608	0.943		1.096		0.000		-		0.000	Continuing	Continuing	N/A	

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 0798 / Allied/Coalition Interoperability and Information Dominance (ACIID)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0798				
Allied/Coalition Maritime Environment (ACME): RIMPAC/Joint Warrior Event Quarterly FY17-FY18	3	2017	1	2018
Allied/Coalition Maritime Environment (ACME): RIMPAC/Joint Warrior Event Quarterly FY18-FY19	3	2018	4	2018
Allied/Coalition Maritime Environment (ACME): AUSCANNZUKUS M212 Quarterly Events	2	2017	4	2018
Allied/Coalition Maritime Environment (ACME): MODILE Events	1	2017	4	2018
Allied/Coalition Maritime Environment (ACME): High Data Rate LOS & ELOS	1	2017	4	2018
Allied/Coalition Maritime Environment (ACME): Allied/Coalition COP and Related Applications	1	2017	4	2018
Allied/Coalition Maritime Environment (ACME): Maritime MPE and BICES-X Events	1	2017	4	2018
Allied/Coalition Maritime Environment (ACME): Cyber Security Events	1	2017	4	2018
Allied/Coalition Maritime Environment (ACME): Publication Stewardship Bi-Annual Events	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support				Project (Number/Name) 2144 / Space & Elec Warfare Engineering			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2144: Space & Elec Warfare Engineering	209.167	12.879	33.716	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	255.762
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

To support Navy objectives in advancing Information Warfare (IW) capabilities, the Space and Electronic Warfare (SEW) Engineering project provides five main functions:

(1) Develop the architectures, specifications and standards, tools, and processes to support a single integrated Navy plan for cybersecurity. These engineering artifacts provide Navy specific guidance to drive common and consistent implementation of security controls across current and future Navy Programs of Record/projects. This eliminates redundancies and inefficiencies characteristic of previous stove-pipe development efforts in which each system addressed security individually. These efforts enable a standardized approach to move out faster to improve the Navy's cyber resiliency.

(2) Provide the cybersecurity vulnerability and functional test capability which supports cybersecurity test requirements and the Command, Control, Communications, Computers, Intelligence (C4I) components of USS Secure. USS Secure is a cyber assessment program within the Navy. This System of Systems (SoS) (Afloat, Aloft, C4I & Shore) capability in a test laboratory environment provides a rapidly re-configurable capability that integrates maritime hardware systems into a virtual platform. This platform level SoS provides cybersecurity research, development, test and evaluation, and training, not otherwise possible. This combination of Systems Commands (SYSCOM) laboratories, cyber ranges, and Red Teams simulating Navy platforms in operational maritime environments is critical for effectively evaluating cyber threats against specified mission threads.

(3) Define an integrated Enterprise Architecture to support design, development and delivery of integrated Navy Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System capabilities. This architecture reflects current (as-is) and future (target) end states to support technical analyses, program planning, and enterprise-level investment decisions across IW capabilities. Perform mission based system of systems analysis to ensure integration and interoperability, and validate end-to-end warfighting capabilities to quickly address emerging threats.

(4) Provides engineering tools and processes to drive rigorous Systems Engineering discipline across the acquisition lifecycle to support rapid development and delivery of secure and interoperable C4ISR, Business IT, and Space Systems capabilities that meet Fleet requirements. Conduct Systems Engineering Technical Reviews (SETRs) to provide independent, objective assessments of technical maturity and compliance with applicable architectures, specifications and standards across IW capabilities.

(5) The Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) provides a means to demonstrate and evaluate the interoperability of United States (US), North Atlantic Treaty Organization (NATO), and coalition information sharing systems.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Cybersecurity Architecture, Specifications and Standards	Articles:	8.459	8.460	0.000	0.000	0.000
<p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Continue to develop the architectures, specifications, and standards that provide the technical foundation of a single, integrated Navy plan for cybersecurity in accordance with changes in the threat environment, advances in technology, and evolving Department of Defense (DoD) guidance. - Enforce implementation guidance for Navy Information Assurance (IA) (cybersecurity) standards to ensure inclusion in design requirements and development and production contracts that touch or influence cybersecurity designs for Navy networks. - Assess Navy Programs of Record (PoR) plans for implementation of cybersecurity controls, assess compliance to determine cyber risk with IA Technical Authority (TA) cybersecurity architectures and standards, and perform risk assessments that articulate systems' ability to effectively support operational missions in various cyber conditions. - Continue DFIANT work across Naval Systems Commands (SYSCOMs) to develop domain-specific implementations of the Defense-in-Depth Functional Implementation Architecture (DFIA) by defining control points, IA and logical attributes, controlling parameters, and inheritable security controls to establish a layered approach to cybersecurity. - Define enterprise-level engineering requirements to support effective implementation and integration of Navy Cybersecurity Situational Awareness (NCSA) tools to enable command and control of Navy networks under all cyber conditions. - Continue to assess Acquisition Category (ACAT) programs compliance with Information Technology (IT), IA, and TA architectures, specifications and standards. <p>FY 2019 Base Plans:</p> <p>FY19 Cybersecurity Architecture, Specifications and Standards funding resides under PE 0606355N WARFARE INNOVATION MANAGEMENT.</p> <p>FY 2019 OCO Plans:</p> <p>N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Beginning in FY19, the Cybersecurity Architecture, Specifications and Standards funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N WARFARE INNOVATION MANAGEMENT.						
Title: Cybersecurity Vulnerability & Functional Test Capability	Articles:	0.000	21.311	0.000	0.000	0.000
FY 2018 Plans: - Initial planning and procurement to establish cybersecurity test capabilities and the Command, Control, Communications, Computers, Intelligence (C4I) components of the USS Secure, a cross-SYSCOM distributed Cyber test capability in support of cybersecurity testing. Procure two (2) laboratory assets, one (1) force-level and one (1) unit-level, to establish Command, Control, Communications, Computers, Intelligence (C4I) suites for testing the System of Systems (SoS) cyber capabilities in an end-to-end environment. - Perform Non-Recurring Engineering (NRE) and testing to evaluate the compliance efforts of Programs of Record (PoRs) with the Department of Defense (DoD) and the Department of Navy (DoN) cybersecurity Test and Evaluation (T&E) policies, directives and requirements. - Design the capability to test operationally representative C4I baselines including force level platforms, unit level platforms, and associated shore services and transport capabilities. - Develop and mature connectivity (including assessment and authorization) strategies to combine Systems Command (SYSCOM) laboratories, cyber ranges, and Red Teams to develop more accurate simulations of Navy platforms in operational maritime environments allowing for critical, effective, and expeditious evaluation of cyber threats against specified mission threads.	-	2	-	-	-	
FY 2019 Base Plans: FY19 Cybersecurity Vulnerability & Functional Test Capability funding resides under PE 0606355N WARAFE INNOVATION MANAGEMENT.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Beginning in FY19, the Cybersecurity Vulnerability & Functional Test Capability funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N WARFARE INNOVATION MANAGEMENT.						
Title: Enterprise Architecture		0.845	0.716	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018													
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering														
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		Articles: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">FY 2017</th> <th style="text-align: center;">FY 2018</th> <th style="text-align: center;">FY 2019 Base</th> <th style="text-align: center;">FY 2019 OCO</th> <th style="text-align: center;">FY 2019 Total</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">-</td> </tr> </tbody> </table>					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	-	-	-	-	-
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total												
-	-	-	-	-												
FY 2018 Plans: <ul style="list-style-type: none"> - Continue development of an overarching Space and Naval Warfare Systems Command (SPAWAR) Enterprise Architecture with associated specifications, standards and profiles to support effective engineering, design, development, acquisition, and delivery of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), Business Information Technology (IT), and Space System capabilities. - Continue to develop the Architecture Data Repository as the single, authoritative source of validated engineering artifacts with associated technical performance attributes. - Continue development of Model Based System Engineering (MBSE) capabilities, processes and tools to support complex SoS technical performance gap analysis and trade recommendations by identifying capability gaps and overlaps, interoperability issues, and cybersecurity risks between Navy SoS capabilities. - Continue to refine the Integration and Interoperability (I&I) Capability framework to support development of mission threads in order to perform System of Systems (SoS) analyses of how well systems operate together across the Naval enterprise to deliver validated warfighting capabilities. - Continue to evolve Assured Command and Control (C2), Battlespace Awareness, and Integrated Fires (IF) Integrated Capabilities Technical Baselines (ICTBs) to ensure Information Warfare (IW) capabilities align to mission-specific kill chains to reduce interoperability seams across the supporting SoS. - Ensure alignment of ICTBs development to emerging Digital Warfare Office (DWO) objectives for increased interoperability and information sharing across weapons, sensors, and shooters. 																
FY 2019 Base Plans: FY19 Enterprise Architecture funding resides under PE 0606355N WARFARE INNOVATION MANAGEMENT.																
FY 2019 OCO Plans: N/A																
FY 2018 to FY 2019 Increase/Decrease Statement: Beginning in FY19, the Enterprise Architecture funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N WARFARE INNOVATION MANAGEMENT.																
Title: SYSCom Systems Engineering	Articles: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">2.592</td> <td style="text-align: center;">2.197</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">0.000</td> </tr> <tr> <td style="text-align: center;">-</td> </tr> </table>	2.592	2.197	0.000	0.000	0.000	-	-	-	-	-					
2.592	2.197	0.000	0.000	0.000												
-	-	-	-	-												
FY 2018 Plans:																

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<ul style="list-style-type: none"> - Perform Systems Engineering Technical Reviews (SETRs) of acquisition programs ensuring compliance with statutory and regulatory directives, as well as applicable Information Technology (IT) and Information Assurance (IA) Technical Authority (TA) architectures, specifications, standards and profiles. - Develop inputs and perform technical reviews of formal acquisition and engineering documentation to ensure the application of sound systems engineering analysis and design principles to system planning requirements, design, testing, and supportability. Provide independent technical analyses to support Milestone Decisions. - Continue to conduct Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) certifications through design and testing analysis, ensuring C4ISR delivery to the platform (shore, surface ship, submarine) is validated to meet the operational need and is interoperable with platform, force level, and joint/allied/coalition forces. - Assess opportunities to leverage existing processes to define a more holistic cyber certification that moves toward assessments of groups of platforms (i.e., Carrier Strike Groups) and the overall cyber risk to performing operational missions. - Continue to perform engineering evaluations, assessments of compliance with authoritative architectures and technical standards, and provide expertise to address technical issues in the following domains: C2; Intelligence, Surveillance, & Reconnaissance/Information Operations (ISR/IO); Space Systems, Business Information Technology (IT); and Communications & Networks. - Continue maturation of the Space and Naval Warfare Systems Command (SPAWAR) Engineering Competency Development Model (CDM) framework by defining CDM roles for IT Engineers, Cybersecurity Engineers and Software Systems Engineers. - Develop and pilot a Competency Assessment Process and establish IT requirements for an integrated talent management dashboard. 						
FY 2019 Base Plans: FY19 SYSCOM Systems Engineering funding resides under PE 0606355N WARFARE INNOVATION MANAGEMENT.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Beginning in FY19, the SYSCOM Systems Engineering funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N WARFARE INNOVATION MANAGEMENT.						
Title: Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX)		0.983	1.032	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							
		Articles:	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: -Continue to develop interoperability and information sharing through coalition engagement, technology, demonstrations, and assessments leading to improvements of Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems within the Navy and in conjunction with Joint Services and Coalition efforts. -Continue to pursue and utilize greater Pacific Command (PACOM) and Southern Command (SOUTHCOM) Partner Nation engagement by fostering a connected, distributed experimentation environment suitable for expanded experimentation in those areas to include innovative enhancements such as Commercial Solutions for Classified (CSFC). -Continue to enhance interoperability across North Atlantic Treaty Organization (NATO) and affiliated Coalition Partners by participating in the planning and execution of CWIX. -Continue to assess Coalition Interoperability assurance, validation, and verification as related to the engineering and execution of the Mission Partner Environment (MPE) via the Coalition Interoperability Assurance Validation (CIAV) infrastructure.			-	-	-	-	-
FY 2019 Base Plans: FY19 CWIX funding resides under PE 0606355N WARFARE INNOVATION MANAGEMENT.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Beginning in FY19, the CWIX funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N WARFARE INNOVATION MANAGEMENT.							
Accomplishments/Planned Programs Subtotals			12.879	33.716	0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)							
N/A							
Remarks							
D. Acquisition Strategy Space and Electronic Warfare (SEW) Engineering is a non-acquisition program that develops, tests, implements technical authority, and validates naval Navy Command, Control, Communications, Computers, Intelligence,							

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering
Surveillance, and Reconnaissance (C4ISR); provides integrated Architecture products and supports C4ISR systems engineering processes and standards. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.		
E. Performance Metrics <p>The SEW engineering program will employ rigorous and consistent system engineering practices in an evolving value model to support development and deployment of shipboard, undersea, and land based capabilities based on mission and performance requirements, integrated enterprise architectures, model-validated solutions, and sustainment and supportability needs for the Command and Control (C2), Intelligence, Networks, Communications, Space, and Business Information Technology (IT) domains.</p> <p>Coalition Warrior Interoperability eXploration, eXperimentation, eXamination, eXercise (CWIX) Performance Metrics: Three key metrics: (1) Interoperability and compliance with Naval (Navy and Marine Corps), joint, coalition and other non-governmental organization architectures, systems and equipment; (2) Compliance with Defense Information Services Agency (DISA), National Security Agency (NSA), and other joint and coalition information assurance and security standards; and (3) warfighter utility assessment across the joint and coalition spectrum. Specific metrics validate performance of individual technologies participating in CWIX as well as in other venues as appropriate.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support				Project (Number/Name) 2144 / Space & Elec Warfare Engineering							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Cybersecurity Architecture, Specifications and Standards	Various	Various : Various	8.667	0.000		0.000		0.000		-		0.000	0.000	8.667	-
Cybersecurity Architecture, Specifications and Standards	C/CPFF	AUSGAR : San Diego, CA	4.503	1.164	Mar 2017	1.164	Mar 2018	0.000		-		0.000	0.000	6.831	-
Cybersecurity Architecture, Specifications and Standards	WR	SSC LANT : Charleston, SC	2.876	1.269	Feb 2017	1.270	Feb 2018	0.000		-		0.000	0.000	5.415	-
Cybersecurity Architecture, Specifications and Standards	WR	SSC PAC : San Diego, CA	7.413	3.089	Feb 2017	3.090	Feb 2018	0.000		-		0.000	0.000	13.592	-
Cybersecurity Architecture, Specifications and Standards	C/CPFF	BAH : McLean, VA	4.694	2.937	Jul 2017	2.936	Jul 2018	0.000		-		0.000	0.000	10.567	-
Cybersecurity Vulnerability & Functional Test Capability.	C/CPFF	SSC PAC : San Diego, CA	0.000	0.000		2.880	Jun 2018	0.000		-		0.000	0.000	2.880	-
Cybersecurity Vulnerability & Functional Test Capability	WR	SSC PAC : San Diego, CA	0.000	0.000		7.110	Mar 2018	0.000		-		0.000	0.000	7.110	-
Cybersecurity Vulnerability & Functional Test Capability	WR	SSC LANT : Charleston, SC	0.000	0.000		4.421	Mar 2018	0.000		-		0.000	0.000	4.421	-
Cybersecurity Vulnerability & Functional Test Capability	C/CPFF	Various : Various	0.000	0.000		6.900	Mar 2018	0.000		-		0.000	0.000	6.900	-
Subtotal			28.153	8.459		29.771		0.000		-		0.000	0.000	66.383	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support				Project (Number/Name) 2144 / Space & Elec Warfare Engineering							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SEW Development Support/Systems Engineering	Various	Various : Various	78.537	0.000		0.000		0.000		-		0.000	0.000	78.537	-
SEW/C4I Technology Integration	Various	Various : Various	12.985	0.000		0.000		0.000		-		0.000	0.000	12.985	-
MDA Prototype SE Support	Various	Various : Various	17.376	0.000		0.000		0.000		-		0.000	0.000	17.376	-
Enterprise Architecture	Various	Various : Various	3.630	0.000		0.000		0.000		-		0.000	0.000	3.630	-
Enterprise Architecture	C/CPFF	AUSGAR : San Diego, CA	1.740	0.380	Mar 2017	0.322	Mar 2018	0.000		-		0.000	0.000	2.442	-
Enterprise Architecture	WR	SSC LANT : Charleston, SC	0.994	0.127	Feb 2017	0.107	Feb 2018	0.000		-		0.000	0.000	1.228	-
Enterprise Architecture	WR	SSC PAC : San Diego, CA	2.427	0.338	Feb 2017	0.287	Feb 2018	0.000		-		0.000	0.000	3.052	-
SYSCOM Systems Engineering	C/CPFF	AUSGAR : San Diego, CA	3.115	1.530	Mar 2017	1.297	Mar 2018	0.000		-		0.000	0.000	5.942	-
SYSCOM Systems Engineering	WR	SSC PAC : San Diego, CA	5.487	0.752	Feb 2017	0.638	Feb 2018	0.000		-		0.000	0.000	6.877	-
SYSCOM Systems Engineering	C/CPFF	SAIC : McLean, VA	0.630	0.310	Aug 2017	0.262	Jan 2018	0.000		-		0.000	0.000	1.202	-
Subtotal		126.921	3.437		2.913		0.000		-		0.000	0.000	133.271	N/A	
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
SEW Eng/CWIX/JRAE	Various	Various : Various	48.685	0.000		0.000		0.000		-		0.000	0.000	48.685	-
SEW Eng/CWIX	MIPR	Defense Information Systems Agency : Arlington, VA	0.599	0.110	Apr 2017	0.115	Apr 2018	0.000		-		0.000	0.000	0.824	-
SEW Eng/CWIX	WR	SSC PAC : San Diego, CA	3.977	0.549	Dec 2016	0.576	Dec 2017	0.000		-		0.000	0.000	5.102	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support						Project (Number/Name) 2144 / Space & Elec Warfare Engineering				
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SEW Eng/CWIX	C/CPFF	SAIC : McLean, VA	0.498	0.213	Aug 2017	0.223	Jan 2018	0.000		-		0.000	0.000	0.934	-	
SEW Eng/CWIX	C/CPFF	AUSGAR : San Diego, CA	0.263	0.111	Mar 2017	0.118	Mar 2018	0.000		-		0.000	0.000	0.492	-	
Subtotal		54.022	0.983		1.032		0.000		-		0.000	0.000	56.037	N/A		
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
ACQ Workforce Fund	Various	Various : Various	0.071	0.000		0.000		0.000		-		0.000	0.000	0.071	-	
Subtotal		0.071	0.000		0.000		0.000		-		0.000	0.000	0.071	N/A		
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				209.167	12.879		33.716		0.000		-		0.000	0.000	255.762	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy								Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering							
		Fiscal Year	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
		Quarter	1	2	3	4	1	2	3
<i>Proj 2144</i>									
Space & Elec Warfare Engineering									
Cybersecurity Specifications and Standards Development & Approval by Technical Authority Board (TAB)									
Develop Specifications and Standards									
TAB Approval of Specifications and Standards									
Cybersecurity Architecture: Defense-in-Depth Functional Implementation Architecture (DFIA)									
DFIA Instantiations									
Cybersecurity Vulnerability & Functional Test Capability									
Procurements									
Coalition Warrior Interoperability Demonstration/Coalition Warrior Interoperability Experiment (CWID/CWIX)									
Schedule as directed by Joint Management Office (JMO) during execution year									

Notes:

- Beginning in FY19, Space and Electronic Warfare (SEW) Engineering project (2144) resides under PE 0606355N.
- Based on changes in the threat environment and advances in technology, the development of cybersecurity architectures, specifications, and standards is a continuous process.
- The cross-Systems Command (SYSCOM) TAB occurs approximately once per quarter to review and endorse cybersecurity architectures, specifications, and standards that are applicable to all Navy Programs.

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2144 / Space & Elec Warfare Engineering

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2144				
Cybersecurity Specifications and Standards: Development	1	2017	4	2018
Cybersecurity Specifications and Standards: Technical Authority Board (TAB) Approval	1	2017	4	2018
Cybersecurity Architecture: Defense-in-Depth Functional Implementation Architecture (DFIA) Instantiations	1	2017	4	2018
Cybersecurity Vulnerability & Functional Test Capability: FY18 Procurement	1	2018	4	2018
Coalition Warrior Interoperability Demonstration/Coalition Warrior Interoperability Experiment (CWID/CWIX): Schedule as directed by the JMO during execution year	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support					Project (Number/Name) 2147 / ISR Architecture			
COST (\$ in Millions)		Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2147: ISR Architecture		0.000	1.482	1.587	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.069
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-	-	-	

A. Mission Description and Budget Item Justification

Integrated architectures provide a technical framework for assessing capability gaps and performance of individual systems and System of Systems (SoS) and their ability to effectively provide the desired effects to support warfighting missions. They also serve as a means to influence and drive Programs of Record (PoR) toward a common, more efficient state that promotes interoperability and security.

The Naval Intelligence, Surveillance, and Reconnaissance (ISR) Reference Architecture project is intended to guide system of systems capability development and promote interoperability across Navy ISR programs, as well as interoperability and alignment with Department of Defense (DoD)-wide enterprise initiatives including Joint Information Environment and Intelligence Community Information Technology Environment and Space & Naval Warfare Systems Command-wide Enterprise Architecture policies. This effort to develop integrated ISR architectures will also help instill systems engineering discipline and standardization across the Navy ISR Enterprise and provide a means by which to assess ISR PoR progress in conforming to a single Navy architecture. These efforts will help reduce Information Technology/ISR infrastructure complexity and variances, making it easier to manage, operate and defend our ISR capabilities, and help inform investment decisions across the Navy's ISR enterprise to support Assured Command and Control, Battlespace Awareness and Integrated Fires.

This effort will encompass the documentation and analysis of current ISR enterprise architectures to inform and guide requirements for target architecture development and performance requirements to support full use and incorporation of ISR capabilities to advance Navy operations afloat. The associated studies will produce both technical and non-technical implementation guidance across the Doctrine, Organization, Training, Material, Leadership, Personnel and Facilities spectrum.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Intelligence, Surveillance, and Reconnaissance (ISR) Architecture	1.482	1.587	0.000	0.000	0.000
Articles:	-	-	-	-	-

FY 2018 Plans:

- Continue to analyze the current ISR capabilities of afloat, ashore, joint, and national systems within mission contexts to demonstrate gaps and overlaps in Information Warfare capabilities and document in engineering artifacts and architectures. Perform trade space analysis and develop and quantify solutions using technical and operational performance parameters.
- Continue to build on the documentation and analysis of the enterprise ISR capabilities to support System of Systems (SoS) engineering assessments to identify integration and interoperability gaps, trades, and solutions to support investment decision-making across the ISR portfolio.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2147 / ISR Architecture	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
<p>-Continue to integrate the National, Joint, and Naval ISR architectures within mission contexts to identify functional capacities, materiel integration and interoperability gaps and overlaps, as well as any policy and doctrine impacts.</p> <p>-Continue to perform verification and validation (V&V) to ensure Intelligence, Surveillance, & Reconnaissance (ISR) architecture and analytic products accurately capture system performance specifications.</p> <p>-Continue to capture all architectural data in the Space and Naval Warfare Systems Command (SPAWAR) analysis tool suite to support rigorous engineering assessments and architecture excursions against solution alternatives.</p> <p>-Ensure alignment and interoperability between ISR Architectures and Joint Information Enterprise, Intelligence Community Information Technology Enterprise and SPAWAR Enterprise Architectures.</p>				FY 2019 OCO
FY 2019 Base Plans: FY19 ISR Architecture funding resides under PE 0606355N WARFARE INNOVATION MANAGEMENT. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: Beginning in FY19, ISR Architecture funding profile transferred from PE 0604707N SEW ARCHITECTURE/ENG SUPPORT to PE 0606355N WARFARE INNOVATION MANAGEMENT.				
Accomplishments/Planned Programs Subtotals			1.482	1.587
C. Other Program Funding Summary (\$ in Millions)			0.000	0.000
N/A				
Remarks				
D. Acquisition Strategy The Naval ISR Architecture project is a non-acquisition program that provides integrated architecture products, engineering analysis of current and target/future capabilities to identify capability gaps and shortfalls, and provides solution recommendations. These combined efforts support the ability to articulate risks, and align/prioritize investment decision recommendations within the ISR domain for the Navy.				
E. Performance Metrics The Naval (Navy and Marine Corps) ISR Reference Architecture effort will use consistent systems engineering practices to support development of integrated ISR enterprise architectures, and model-validated solution recommendations against quantified technical and operational performance parameters.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support				Project (Number/Name) 2147 / ISR Architecture							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ISR Architecture	C/CPFF	METRON : Reston, VA	0.000	1.382	Jul 2017	1.480	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
ISR Architecture	WR	SSC PAC : San Diego, CA	0.000	0.100	Jul 2017	0.107	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	1.482		1.587		0.000		-		0.000	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	1.482		1.587		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

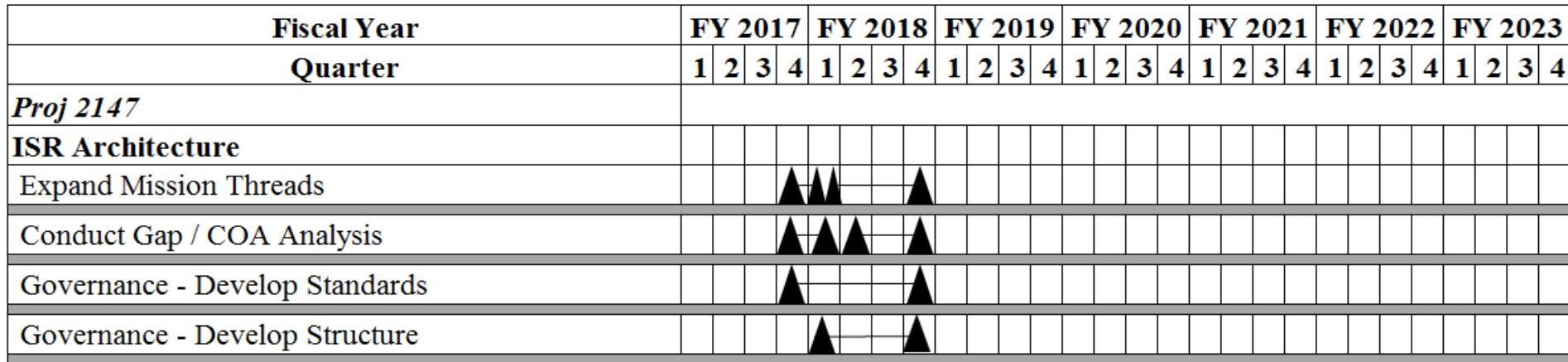
1319 / 4

R-1 Program Element (Number/Name)

PE 0604707N / SEW Architecture/Eng Support

Project (Number/Name)

2147 / ISR Architecture

*Notes:*

-Beginning in FY19, Intelligence, Surveillance, and Reconnaissance (ISR) Architecture project (2147) resides under PE 0606355N.

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2147 / ISR Architecture		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 2147</i>				
ISR Architecture: Expand Mission Threads		4	2017	4
ISR Architecture: FY17 Conduct Gap / COA Analysis		4	2017	1
ISR Architecture: FY18 Conduct Gap / COA Analysis		2	2018	4
ISR Architecture: Governance - Develop Standards		4	2017	4
ISR Architecture: Governance - Develop Structure		1	2018	4

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)				
1319 / 4					PE 0604707N / SEW Architecture/Eng Support				2356 / Maritime Concept Generation & Development				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
2356: <i>Maritime Concept Generation & Development</i>	22.409	4.800	6.452	7.230	-	7.230	8.160	9.024	9.220	9.407	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

A. Mission Description and Budget Item Justification

Maritime Concept Generation and Development (MCGD) funding provides naval warfare subject matter expertise, experiment planning expertise, Modeling and Simulation (M&S) support, and analysis expertise to enable execution of the planned experiment efforts (and the individual experiment initiatives contained within) in the areas of Electromagnetic Maneuver Warfare (EMW), Mine Warfare, Naval Integrated Fires, and Unmanned systems and conduct experiments (war simulations, M&S, at-sea events) to develop emerging Naval concepts.

Typical deliverables for each experimental effort include:

- Experiment control plan
- Data Collection and Analysis Plan (DCAP)
- Experiment Analysis Summary Reference Document
- Experiment Engineering Plan
- Final Experiment Report (with doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) recommendations)
- New/refined doctrine/Tactics, Techniques and Procedures (TTP).

The Maritime Concept Generation and Concept Development project funds four main efforts:

(1) Provides critical concept development and experimentation manpower and warfighting subject matter expertise aligned with the Concept Generation/Concept Development (CG/CD) program. The priorities for the CG/CD program are to develop concept/concept of operations and explore near/far-term technological and non-technological solutions to war fighting gaps across all naval warfare areas. The associated experimentation efforts include planning, systems engineering and integration, modeling and simulation support, event execution, data collection, analysis, and assessment for a wide-range of experimentation efforts including the examination of prototypes, tactical development and evaluation, support for Science and Technology (S&T) innovation, and program of record system development; venues such as workshops, seminars, war games, limited objective experiments, limited technical experiments, and live at-sea events are used to execute these experimentation efforts.

(2) Provides naval warfare subject matter expertise, experiment planning expertise, and analysis expertise who plans, executes, and assesses experimentation for the fleets and warfighting development centers (WDC) at the operational and tactical levels. This includes a focus on WDC integration role, maritime command and control (C2), advanced cross-domain warfighting, and maritime operations centers (MOCS)/operational level of war (OLW) lines of operations. Seeks to solve fleet-identified warfighting gaps (referenced within the Integrated Prioritized Capability Lists (IPCL), Urgent Operational Needs Statements (UONS), Fleet Commander's Guidance, etc.). The experimentation and prototyping efforts support the "last tactical mile" of many Navy S&T programs by supporting those programs where the technology is mature enough, but requires evaluation on or by a "fleet asset" - ships, airplanes, submarines, and sailors.

(3) Provides modeling and simulation (M&S) support to Navy experimentation efforts. M&S is used to stimulate decision making during seminar-style and system war gaming experiments and provides the simulated operational environment and capabilities with high-fidelity models such as the Joint Semi-Automated Force (JSAF)

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018				
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)							
1319 / 4	PE 0604707N / SEW Architecture/Eng Support	2356 / Maritime Concept Generation & Development							
program. Additionally, where applicable, the Navy Simulation System (NSS) "Monte Carlo" model is also used to give high confidence solutions and outcomes to complex warfighting problems.									
(4) Provides for focused, solution-driven tactics development and evaluation through experimentation. This effort is focused on developing near-term doctrine solutions to address specific fleet-identified tactical issues.									
Maritime Concept Generation and Concept Development products include:									
<ul style="list-style-type: none"> - Enabling concepts - Concepts of operations (CONOPS) - Final experiment reports (including findings, insights, and recommendations and DOTMLPF change recommendations and plans for action) - Experiment Analysis Summary Reference Documents - New/revised doctrinal and Tactics/Techniques/Procedures publications - White papers (think pieces) intended to generate further discussion within Navy leadership 									
Specific products are listed in the Accomplishments/Plans section of this exhibit.									
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2017	FY 2018	FY 2019 Base				
Title: Maritime Concept Generation and Development			4.800	6.452	7.230				
Articles:			-	-	-				
FY 2018 Plans:									
FY 2018 experiment efforts through MCGD; Navy will provide experiment, analytical and naval mission subject matter expertise support throughout the planning and execution process; identify fleet warfighting deficiencies through experimentation; identify and capture innovative solutions for fleet experiments that address prioritized fleet warfighting gaps; and identify suitable events to support the execution of the following Experimentation Campaigns:									
ELECTROMAGNETIC MANEUVER WARFARE (EMW) EXPERIMENTATION									
Navy will conduct multiple events designed to synchronize and align experiment initiatives with EMW campaign tasks to provide solutions to EMW capability gaps and to ensure development of doctrine is synchronized with the introduction of new technology in order to provide the Fleet and Fleet trainers with required capabilities at the tactical and operational levels.									
RIMPAC 18 AT-SEA EXPERIMENT - This event will leverage the fleet assets and at-sea time associated with a major training exercise, Rim of the Pacific (RIMPAC) 2018. The effort will evaluate technology and/or Tactics, Techniques, Procedures (TTP) related initiatives to close warfighting gaps identified across multiple POM-19 Integrated Prioritized Capability Lists (IPCLs).									
SPECTRAL TSUNAMI 2018 SEMINAR WAR SIMULATION - This effort is comprised of stakeholders from across the Navy to define the baseline warfighting scenario and existing technical capabilities to form an									

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2356 / Maritime Concept Generation & Development	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>Integrated Technical Capabilities Baseline (ITCB). The war simulation will identify areas of strengths and weaknesses, areas for improving operational effectiveness and hardware/software changes necessary to improve existing POR systems or suggest requirements for new capability. Following completion, the simulation output will be injected into the Naval Simulation System (NSS) for advanced modeling and simulation to quantify the tactical and operational impact of multiple proposed PoR and S&T solutions and innovative employment methods. The war simulation will build upon the results of the 2017 war simulation and the scope will be expanded to include select coalition capabilities.</p> <p>NETTED SENSORS AT-SEA EXPERIMENT - This continued effort at operationalizing the Fleet Tactical Grid will leverage STORMFORCE 2018, a National Security Agency (NSA)-sponsored Five Eyes tactical signals intelligence (SIGINT) interoperability-focused experiment to examine and enhance integration and interoperability of sensors, networks, data fusion, and analytic capabilities across national, theater, and organic platforms.</p> <p>STRIKE GROUP-ORGANIC, LONG ENDURANCE UNMANNED AERIAL VEHICLE (UAV) experiment - This experiment effort will examine the employment of long endurance UAVs organic to a Carrier or Expeditionary Strike Group - a capability that will provide unit level ships with the ability to transport Intelligence, Surveillance, and Reconnaissance (ISR) and strike payloads long distances from the host platform.</p> <p>BLUE EMITTER VULNERABILITY ASSESSMENT (BEVA) - This classified effort will be an in-depth examination of U.S. Navy system vulnerabilities.</p> <p>COUNTER-ISR WAR SIMULATION - This classified modeling and simulation supported war simulation will be an examination of the employment of emerging TTPs and technologies in support of Distributed Maritime Operations.</p> <p>OFFICE OF NAVAL RESEARCH (ONR) TECHNOLOGY INNOVATION GAMES (TIGS). This series of workshops executed in conjunction with ONR will give Fleet operators the opportunity to examine emerging capabilities and determine potential concepts of employment to effectively incorporate innovative capabilities into Fleet warfighting missions and tasks. Potential technology being examined include: High Power Joint Electromagnetic Non-Kinetic Strike (HIJENKS); Medium Displacement Unmanned Surface Vessel (MDUSV) Anti-Submarine Warfare (ASW) Concept of Employment; Unmanned Systems (UxS) Defensive Actions; and Forward Deployed Energy & Communications Outpost (FDECO).</p> <p>ASSURED COMMAND AND CONTROL (AC2) AT SEA EXPERIMENT - This effort will likely leverage the naval assets and at-sea time to conduct an extended evaluation of an emerging technology in support of EMW objectives.</p> <p>TECHNOLOGY/TTP EXPERIMENT - This experiment will refine TTP and technical requirements to employ a classified Navy Tactical Exploitation of National Capabilities (TENCAP) developed capability.</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)				
1319 / 4	PE 0604707N / SEW Architecture/Eng Support	2356 / Maritime Concept Generation & Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>CYBER DEFENSE WAR SIMULATION AND/OR AT SEA EXPERIMENT - This classified effort will build upon prior year experiments to further examine US Navy vulnerabilities to adversary cyber threats.</p> <p>COUNTER-UNMANNED SYSTEMS EXPERIMENT SERIES - This effort will build upon the 2017 counter-UAV experiment by examining emerging TTPs and technologies to counter the proliferation of unmanned undersea, surface, and air vehicles.</p> <p>NAVAL FORCE INTEGRATION EXPERIMENTATION</p> <p>Naval Force Integration experimentation will examine integration and interoperability issues associated with coordinated USN-USMC operations. The primary goal is to reexamine Navy and Marine Corps organizational and command relationships in order to enable effective Naval operations across the maritime domain.</p> <p>LITTORAL OPERATIONS IN A CONTESTED ENVIRONMENT (LOCE) War Simulation - This simulation will focus on operational level objectives and examine how a Navy Commander task organizes to achieve sea control in complex, contested environments.</p> <p>F-35B BLOCK 3F FIRST DEPLOYMENT INITIATIVE War Simulation - This effort will employ a combination of vignettes augmented with an integrated limited virtual constructive environment. Scenarios will be planned, briefed and executed in a limited virtual, constructive environment.</p> <p>MINE WARFARE (MIW) EXPERIMENTATION</p> <p>Through workshops, war simulation and at-sea events, the FY 18 efforts will continue to examine TTP and Command and Control (C2) construct for our future Mine Counter-Measures (MCM) force as new programs of record and unmanned systems come on line, and legacy systems begin to decommission.</p> <p>MCM WAR SIMULATION AND/OR AT SEA EXPERIMENT - This effort will examine current and planned Navy MCM equipment (manned and unmanned) and evaluate concepts of employment with an overall goal of developing a product that merges overall Navy requirements.</p> <p>MCM EXPERIMENT - In support of C6F, this experiment will look at MCM C2 and capability to execute requirements.</p> <p>OPERATIONAL LEVEL OF WAR/TACTICAL LEVEL OF WAR (OLW/TLW) INTEGRATION EXPERIMENTATION</p> <p>Another CUSFF/CPF designated focus area for experimentation in 2018, OLW/TLW Integration experiments will examine current and emerging tactics, techniques, and procedures (TTPs) and current and emerging technologies with a goal of identifying innovative solutions that will support the capstone naval concept of a Fleet Design based on integration, distribution, and maneuver.</p> <p>NAVAL INTEGRATED FIRES ELEMENT (NIFE) War Simulation - This effort will examine and refine a draft NIFE Tactical Memorandum (TACMEMO) to facilitate transition of TTP to formal doctrine and development</p>						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)		
1319 / 4	PE 0604707N / SEW Architecture/Eng Support	2356 / Maritime Concept Generation & Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				
of training requirements at the operational level of war (OLW) and tactical level of war (TLW) in support of enhanced maritime targeting capabilities. SPACE WAR SIMULATION - This effort will build upon the findings and recommendations of the 2017 war simulation in order to further explore the optimization of space-based capabilities in support of the maritime environment. EMERGING CONCEPTS WAR SIMULATION(S) - This effort will employ multiple seminar war simulations to examine emerging concepts such as Fleet Design, Distributed Maritime Operations, and multiple feeder concepts.		FY 2017	FY 2018	FY 2019 Base
FY 2019 Base Plans: FY 2019 experiment efforts through MCGD; Navy will continue to provide experiment, analytical and naval mission subject matter expertise support throughout the planning and execution process; identify fleet warfighting deficiencies through experimentation; identify and capture innovative solutions for fleet experiments that address prioritized fleet warfighting gaps; and identify suitable events to support the execution of the following Experimentation Campaigns: FLEET DESIGN EXPERIMENTS In keeping with the CNO's Design for Maintaining Maritime Superiority, the emerging concept "Fleet Design" has been developed. Continuing the development of the supporting doctrine, Tactics, Techniques & Procedures (TTP), Command and control (C2) as well as the integration and interoperability required between weapon systems and decision makers requires a methodical experimental approach. FY 19 experiments (both at-sea and via war simulation) will strive to achieve the objectives as laid out in the accompanying action/implementation plan. ELECTROMAGNETIC MANEUVER WARFARE (EMW) EXPERIMENTATION Navy will conduct multiple events designed to synchronize and align experiment initiatives with EMW tasks to provide solutions to EMW capability gaps and to ensure development of doctrine and TTP is synchronized with the introduction of new technology and provides the Fleet and Fleet trainers with required doctrine tools at the tactical and operational levels. EMW TECHNOLOGY War Simulation - This effort is comprised of stakeholders from across the Navy to define the baseline warfighting scenario and existing technical capabilities to form an Integrated Technical Capabilities Baseline (ITCB). The war simulation will identify areas of strengths and weaknesses, areas for improving operational effectiveness and hardware/software changes necessary to improve existing POR systems or suggest requirements for new capability. Following completion, the simulation output will be injected into the		FY 2019 OCO	FY 2019 Total	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2356 / Maritime Concept Generation & Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Naval Simulation System (NSS) for advanced modeling and simulation to quantify the tactical and operational impact of various proposed solutions and innovative employment methods.						
NETTED SENSORS At-Sea Experiment - This effort will examine and enhance the integration and interoperability of sensors, networks, data fusion, and analytic capabilities across national, theater, and organic platforms to explore the vision for a Fleet Tactical Grid.						
EMW At Sea Experiment - This effort will examine emerging EMW-related technologies with the most potential, as identified during the EMW technology series of war games, in an at-sea environment in order to inform future investment decisions and to support the rapid introduction of potentially game-changing capabilities.						
OFFICE OF NAVAL RESEARCH (ONR) TECHNOLOGY INNOVATION GAMES (TIGS). This series of workshops executed in conjunction with ONR will give Fleet operators the opportunity to examine emerging capabilities and determine potential concepts of employment to effectively incorporate innovative capabilities into Fleet warfighting missions and tasks.						
NAVAL FORCE INTEGRATION EXPERIMENTATION Naval Force Integration experiments (workshops, war simulations, and at-sea events) will examine integration and interoperability issues associated with coordinated USN-USMC operations. The primary goal of the campaign is to reexamine Navy and Marine Corps organizational and command relationships in order to enable effective Naval operations across the maritime domain.						
MINE WARFARE (MIW) EXPERIMENTATION Through workshops, war simulation and at-sea events, the FY 19 efforts will continue to examine TTP and C2 construct for our future MCM force as new programs of record and unmanned systems come on line, and legacy systems begin to decommission.						
OPERATIONAL LEVEL OF WAR/TACTICAL LEVEL OF WAR (OLW/TLW) INTEGRATION EXPERIMENTATION OLW/TLW Integration experiments (workshops, war simulation and at-sea events) will examine current and emerging tactics, techniques, and procedures (TTPs) and current and emerging technologies with a goal of identifying innovative solutions that will support the capstone naval concept of a Fleet Design based on integration, distribution, and maneuver.						
EMERGING CONCEPTS WAR SIMULATION(S) - This effort will employ multiple seminar war simulations to examine emerging concepts such as Fleet Design, Distributed Maritime Operations, and multiple feeder concepts.						
FOR FY 19 CONCEPT GENERATION/CONCEPT DEVELOPMENT Continue CG/CD development efforts that carry-over from FY 2018:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2356 / Maritime Concept Generation & Development					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Navy will finish enabling concepts for Fleet Design. This includes development of the Distributed Maritime Operations concept (DMO).							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY18 to FY19 is due to the rapid development of resilient war fighting capabilities to ensure the Navy can operate confidently and fight decisively with our weapons and systems.							
C. Other Program Funding Summary (\$ in Millions)		Accomplishments/Planned Programs Subtotals	4.800	6.452	7.230	0.000	7.230
D. Acquisition Strategy This funding is used to acquire intellectual capital in emerging conceptual and technical areas through contracts providing expertise in concepts and experiment design, execution and analysis to mitigate fleet-identified current and future war fighting gaps.							
E. Performance Metrics Maritime Concept Generation and Development/Related Experimentation: <ul style="list-style-type: none">- Integrate emergent concepts and technologies, leading to rapid introduction of needed war fighting capabilities.- Rapidly mature concepts, technologies, and doctrine.- Develop near-term doctrine solutions to address specific fleet-identified tactical level / operation level issues- Develop recommended Doctrine, Organization, Training, Materiel, Leadership, and Personnel (DOTMLP) changes required to introduce emergent technology and tactics.- Refine concepts and identify key performance levels necessary for implementation.- Demonstrate feasibility and discriminate among competing concepts and implementation alternatives.- Identify potential military effectiveness and risk.- Evaluate how much of the new capability and attendant force structure is needed.- Identify how to operate the new force and combine it with the legacy force.- Focus on near, mid and long term war fighting challenges to realize increased war fighting effectiveness.							

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support				Project (Number/Name) 2356 / Maritime Concept Generation & Development							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation	C/CPFF	Defense Technical Information Center : Ft Belvoir VA	10.271	2.442	Dec 2016	4.026	Dec 2017	4.148	Jan 2019	-		4.148	Continuing	Continuing	Continuing
System Test and Evaluation	Various	SPAWAR SYS CEN : Charleston, SC	2.734	0.000	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System Test and Evaluation	Various	ONR : Washington, DC	1.370	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System Test and Evaluation	Various	NAVSEA : Washington, DC	1.334	0.000		0.000		0.000		-		0.000	0.000	1.334	-
System Test and Evaluation	WR	Naval Underwater Warfare Center : Newport RI	0.500	0.000		0.000		0.000		-		0.000	0.000	0.500	-
System Test and Evaluation	C/CPFF	NAVSUP : Norfolk VA	3.490	2.204	Dec 2016	2.426	Dec 2017	3.082	Dec 2018	-		3.082	0.000	11.202	-
Center for Naval Analysis	IA	Center for Naval Analysis : Norfolk, VA	0.000	0.154	Nov 2016	0.000		0.000		-		0.000	0.000	0.154	-
Subtotal		19.699	4.800		6.452		7.230		-			7.230	Continuing	Continuing	N/A

Remarks

The vast majority of the contract costs are for contract labor; primarily on two large Multi-Award contracts, one through DTIC (Defense Services MAC) and one through Joint Staff J-7 MAC. Task orders on the DS MAC contract provide the majority of the Modeling & Simulation support for experimentation and some of the experiment planner support. Task orders on the JS J-7 MAC provide the majority of the experiment design, planner, and execution support.

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	C/FFP	Navy Warfare Development Command : Norfolk, VA	2.710	0.000		0.000		0.000		-		0.000	0.000	2.710	-
Subtotal		2.710	0.000		0.000		0.000		-			0.000	0.000	2.710	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy								Date: February 2018					
Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)							
1319 / 4			PE 0604707N / SEW Architecture/Eng Support			2356 / Maritime Concept Generation & Development							
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO	FY 2019 Total	Cost To Complete			
Project Cost Totals	22.409	4.800		6.452		7.230		-	7.230	Continuing			
										Total Cost Target Value of Contract			
										N/A			

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)						
1319 / 4					PE 0604707N / SEW Architecture/Eng Support					2356 / Maritime Concept Generation & Development						
Proj 2356																
FY 2017	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FY 2018																
FY 2019																
FY 2020																
FY 2021																
FY 2022																
FY 2023																
Maritime Concept Generation and Development Efforts: Operational Logistics Concept																
Maritime Concept Generation and Development Efforts: Fleet design / Distributed Maritime OPS Concept																
Maritime Concept Generation and Development Efforts: Electro-Magnetic Maneuver Warfare White Paper and Concept																
Maritime Concept Generation and Development Efforts: Littoral Operations in a Contested Environment Concept																
Experimentation Efforts: Undersea Domain Operating Concept Experimentation Campaign																
Experimentation Efforts: Netted Sensors at Sea Experiment																
Experimentation Efforts: Electromagnetic Maneuver Warfare Experimentation Campaign																
Experimentation Efforts: Fleet Battle Experiment EMW 2016																
Experimentation Efforts: Fleet Battle Experiment EMW 2017																
Experimentation Efforts: SPECTRAL TSUNAMI Wargame series																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018														
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								Project (Number/Name)																
1319 / 4					PE 0604707N / SEW Architecture/Eng Support								2356 / Maritime Concept Generation & Development																
					FY 2017	FY 2018			FY 2019	FY 2020			FY 2021	FY 2022			FY 2023												
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Experimentation Efforts: Navy Tactical Data Network At-Sea Experiment																													
Experimentation Efforts: EMW At-Sea Experiment																													
Experimentation Efforts: Logistic Force Assured C2 Wargame																													
Experimentation Efforts: Mine Counter Measures Wargame 2016																													
Experimentation Efforts: Mning Workshop 2016																													
Experimentation Efforts: MCM At-Sea Experiment 2017																													
Experimentation Efforts: Unmanned System Swarm Campaign																													
Experimentation Efforts: Unmanned Systems Experimentation series																													
Experimentation Efforts: Krystal Sphinx at-sea Demonstration																													
Experimentation Efforts: Trident Warrior 18																													
Experimentation Efforts: Trident Warrior 16																													
Experimentation Efforts: Trident Warrior 17																													
Experimentation Efforts: Counter UAS demonstration																													
Experimentation Efforts: MDUSV workshop																													
Experimentation Efforts: Health services support war game																													
Experimentation Efforts: Unmanned Warrior workshop																													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018																	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								Project (Number/Name)																			
1319 / 4					PE 0604707N / SEW Architecture/Eng Support								2356 / Maritime Concept Generation & Development																			
					FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Experimentation Efforts: Radiant Delphi at sea experiment																																
Experimentation Efforts: Netted Sensors Wargame																																
Experimentation Efforts: Fleet Design experiment campaign																																
Experimentation Efforts: Bold Alligator 17 experiment																																
Experimentation Efforts: Counter UAS at sea experiment series																																
Experimentation Efforts: Fleet Battle Experiment 18																																
Experimentation Efforts: Space Wargame																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2356 / Maritime Concept Generation & Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2356				
Maritime Concept Generation and Development Efforts: Operational Logistics Concept	1	2017	4	2023
Maritime Concept Generation and Development Efforts: Fleet design / Distributed Maritime OPS Concept	3	2017	4	2023
Maritime Concept Generation and Development Efforts: Electro-Magnetic Maneuver Warfare White Paper and Concept	1	2017	4	2023
Maritime Concept Generation and Development Efforts: Littoral Operations in a Contested Environment Concept	1	2017	4	2023
Experimentation Efforts: Undersea Domain Operating Concept Experimentation Campaign	1	2017	4	2023
Experimentation Efforts: Netted Sensors at Sea Experiment	1	2017	4	2023
Experimentation Efforts: Electromagnetic Maneuver Warfare Experimentation Campaign	1	2017	4	2023
Experimentation Efforts: Fleet Battle Experiment EMW 2016	1	2017	4	2023
Experimentation Efforts: Fleet Battle Experiment EMW 2017	1	2017	4	2023
Experimentation Efforts: SPECTRAL TSUNAMI Wargame series	1	2017	4	2023
Experimentation Efforts: Navy Tactical Data Network At-Sea Experiment	1	2017	4	2023
Experimentation Efforts: EMW At-Sea Experiment	2	2017	4	2023
Experimentation Efforts: Logistic Force Assured C2 Wargame	1	2017	4	2023
Experimentation Efforts: Mine Counter Measures Wargame 2016	1	2017	4	2023
Experimentation Efforts: Mining Workshop 2016	1	2017	4	2023
Experimentation Efforts: MCM At-Sea Experiment 2017	3	2017	4	2023
Experimentation Efforts: Unmanned System Swarm Campaign	1	2017	4	2023

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604707N / SEW Architecture/Eng Support	Project (Number/Name) 2356 / Maritime Concept Generation & Development		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
	1	2017	4	2023
	1	2017	4	2023
	4	2017	4	2023
	1	2017	4	2023
	4	2017	4	2023
	1	2017	4	2023
	1	2017	4	2023
	1	2017	4	2023
	1	2017	4	2023
	1	2017	4	2023
	1	2017	4	2023
	2	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018				
Appropriation/Budget Activity					R-1 Program Element (Number/Name)										
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev										
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost			
Total Program Element	694.719	301.554	160.694	143.062	-	143.062	51.051	0.000	0.000	0.000	0.000	1,351.080			
3337: Offensive Anti-Surface Warfare (OASuW) Weapon	694.719	301.554	160.694	143.062	-	143.062	51.051	0.000	0.000	0.000	0.000	1,351.080			
Program MDAP/MAIS Code:															
Project MDAP/MAIS Code(s): P449															
A. Mission Description and Budget Item Justification															
Offensive Anti-Surface Warfare (OASuW) will be an offensive weapon system that can be air, surface, and subsurface launched in the maritime battle space environment. OASuW will be a vital component of the Joint Force Anti-Surface Warfare capability and incorporate new and emergent technologies to support an increased offensive strike capability. Due to emerging threats, the fleet issued an Urgent Operational Needs Statement (UONS) that identified a capability gap for a long-range anti-ship missile to be filled by 2018. Directly supporting this UONS and significantly reducing Joint Force warfighting risks, the U.S. Navy initiated OASuW Increment 1 (OASuW-1), which leverages the Defense Advanced Research Projects Agency(DARPA)/Office of Naval Research Long Range Anti-Ship Missile (LRASM) demonstration program to deliver an Early Operational Capability (EOC) in the required timeframe. LRASM fills the most urgent air-launched capability gap to compliment, existing ASuW weapon systems and positions the Department of Defense to address evolving surface warfare threats.															
The OASuW program is part of the Navy's Integrated Fire Control (IFC) approach to address advanced threat capabilities in the Anti-Access/Area-Denial (A2AD) environment. IFC solutions enable individual system capabilities to be leveraged across an effects chain, placing the full spectrum of tactical capability in the hands of the warfighter. IFC solutions that push engagement distances beyond the launch platform's radar horizon and allows the U.S. Navy to operate in, and control, contested battle space in littoral waters and A2/AD environments are increasingly critical as more and more scenarios require compressed and coordinated fire control timelines.															
Budget Item Justification: OASuW-1															
Funding supports the delivery of an EOC of OASuW-1 LRASM weapon system, including the transition of the LRASM demonstration design into a fielded air-launched weapon system, using an accelerated acquisition approach, with streamlined governance. The program is leveraging DoDI 5000.02i Model 4 to structure the acquisition strategy, which includes a highly integrated and concurrent transition design, integration, and developmental / operational test program to meet the EOC schedule required by the UONS. To manage the accelerated timeline and resulting concurrency, the program uses a structured Knowledge Point review process that support decisions regarding significant program events such as transition from design to integration phase and contract awards. These reviews also provide senior DoD leadership the opportunity to provide focused support and active management of technical and acquisition risk and are chaired by the Service Acquisition Executive, ASN(RDA). The knowledge points are similar to acquisition milestone reviews, but occur more frequently and are tailored to program-specific milestone events. Of note, the OASuW Increment 1 knowledge points are defined differently than GAO defines the same term and are tailored to program-specific milestone events. The program met statutory requirements associated with Milestone B at Knowledge Point 3. In addition to the Knowledge Point reviews, Executive Steering Board reviews, chaired by the MDA, are held at least monthly. Supporting these reviews, the associated engineering approach is designed to mitigate resulting risk by implementing a rolling-wave engineering progression based on the NAVAIR Systems Engineering Technical Review (SETR) process to enable detailed planning and decisions as the system															

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy			Date: February 2018			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)					
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev					
matures. This process includes capstone SETR events that are tailored reviews using standard design review criteria. The Technology Maturation efforts in FY 2015 through FY 2017 culminated in a system level Critical Design Review (CDR) level review at SETR 4.0. SETR 3.0 in 4QFY 2015 provided a CDR-level review to support the Knowledge Point 3 decision to initiate the Integration and Test phase for the All Up Round components. SETR 5.0 held in 1QFY 2017 to support Knowledge Point 4 obtained MDA to enter into production.						
This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.						
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Previous President's Budget	313.109	160.694	64.725	-	64.725	
Current President's Budget	301.554	160.694	143.062	-	143.062	
Total Adjustments	-11.555	0.000	78.337	-	78.337	
• Congressional General Reductions	-	-				
• Congressional Directed Reductions	-	-				
• Congressional Rescissions	-	-				
• Congressional Adds	-	-				
• Congressional Directed Transfers	-	-				
• Reprogrammings	-	-				
• SBIR/STTR Transfer	-9.517	0.000				
• Program Adjustments	-50.600	0.000	0.000	-	0.000	
• Rate/Misc Adjustments	0.000	0.000	78.337	-	78.337	
• Congressional Directed Reductions	-2.038	-	-	-	-	
Adjustments						
• Congressional Add Adjustments	50.600	-	-	-	-	

Change Summary Explanation

The FY 2019 funding request was reduced by \$0.007 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.

FY 2019 miscellaneous adjustment of \$78M from previous President's Budget to current President's Budget is supports the continued OASuW Increment 1 development to ensure tactical dominance for the warfighter over a longer period of time by providing sanctuary employment against capital warships. This continued development expands the mission set to address evolving, persistent and dynamic threats and continues to fill gaps in strike warfare.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev				Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3337: Offensive Anti-Surface Warfare (OASuW) Weapon	694.719	301.554	160.694	143.062	-	143.062	51.051	0.000	0.000	0.000	0.000	1,351.080
Quantity of RDT&E Articles	12	1	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: P449												
A. Mission Description and Budget Item Justification												
Offensive Anti-Surface Warfare (OASuW) will be an offensive weapon system that can be air, surface, and subsurface launched in the maritime battle space environment. OASuW will be a vital component of the Joint Force Anti-Surface Warfare capability and incorporate new and emergent technologies to support an increased offensive strike capability. Due to emerging threats, the fleet issued an Urgent Operational Needs Statement (UONS) that identified a capability gap for a long-range anti-ship missile to be filled by 2018. Directly supporting this UONS and significantly reducing Joint Force warfighting risks, the U.S. Navy initiated OASuW Increment 1, which leverages the Defense Advanced Research Projects Agency(DARPA)/Office of Naval Research Long Range Anti-Ship Missile (LRASM) demonstration program to deliver an Early Operational Capability (EOC) in the required timeframe. LRASM fills the most urgent air-launched capability gap to compliment, existing ASuW weapon systems and positions the Department of Defense to address evolving surface warfare threats.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
<i>Title: OASuW Development Program</i>						<i>Articles:</i>	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
<i>FY 2018 Plans:</i> The Integration and Test phase of the program will continue in FY 2018 focusing on B-1 fielding and completion of F/A-18 integration including carrier suitability testing. The final test assets will be delivered in FY 2018. The missile firings and associated modeling and simulation effort will continue the system performance test program. The program will complete Knowledge Point 5 in support of the Lot 2 procurement. USAF EOC will be achieved on the B-1 (SETR 7.0) with Knowledge Point 6.							301.554	160.694	143.062	0.000	143.062	
<i>FY 2019 Base Plans:</i> The Integration and Test phase of the program will continue in FY 2019. The program will complete Knowledge Point 7 in support of the Lot 3 procurement. USN EOC will be achieved on the F/A-18 (SETR 8.0) with Knowledge Point 8. Continued OASuW Increment 1 development (LRASM capability improvements) added to ensure tactical dominance for the warfighter over a longer period of time by providing sanctuary employment							1	-	-	-	-	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018														
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev				Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon																
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)																								
against capital warships. This continued development expands the mission set to address evolving, persistent and dynamic threats and continues to fill gaps in strike warfare.																								
FY 2019 OCO Plans: N/A																								
FY 2018 to FY 2019 Increase/Decrease Statement: Decreasing due to progression in developmental efforts.																								
Accomplishments/Planned Programs Subtotals										301.554	160.694	143.062	0.000	143.062										
C. Other Program Funding Summary (\$ in Millions)																								
Line Item		FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost												
• WPN/2291: LRASM		54.343	74.733	81.190	-	81.190	74.201	75.000	0.000	0.000	0.000	359.467												
• MPAF/8010: LRASM		71.411	44.728	44.581	-	44.581	0.000	0.000	0.000	0.000	0.000	160.720												
Remarks																								
U.S. Navy WPN funding supports the following quantities:																								
FY17 - 15																								
FY18 - 25																								
FY19 - 25																								
FY20 - 25																								
FY21 - 25																								
U.S. Air Force MPAF funding supports the following quantities:																								
FY17 - 19																								
FY18 - 12																								
FY19 - 12																								
D. Acquisition Strategy																								
OASuW-1 is using an accelerated acquisition approach, with streamlined governance to transition the DARPA/ONR-demonstrated Long Range Anti-Ship Missile (LRASM) for use as an air-launched weapon from USAF and USN platforms. The program is leveraging DoDI 5000.02i Model 4 to structure the acquisition strategy,																								

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev	Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon
<p>which includes a highly integrated and concurrent transition design, integration, and developmental / operational test program to meet the 2018 Early Operation Capability (EOC) fielding schedule required by an Urgent Operational Need Statement (UONS) issued by the fleet. The program is structured in three phases: Technology Maturation, Integration and Test, and Procurement. To manage the accelerated timeline and resulting concurrency, the program uses a structured Knowledge Point review process that support decisions regarding significant program events such as transition from design to integration phase and contract awards. These reviews also provide senior DoD leadership the opportunity to provide focused support and active management of technical and acquisition risk and are chaired by the Service Acquisition Executive, ASN(RDA) (delegated MDA), and the Deputy Director of DARPA. The knowledge points are similar to acquisition milestone reviews, but occur more frequently. Of note, the OASuW-1 knowledge points are defined differently than GAO defines the same term. Knowledge Point 1 supported program initiation and approval of the acquisition strategy ; Knowledge Point 2 supported evaluation of the preliminary design of the weapon system as well as release of the Request for Proposal for the Integration and Test phase; Knowledge Point 3 supported evaluation of the final (critical design review level) weapon system design and initiation of/contract award for the Integration and Test phase; Knowledge Point 4 supports the procurement decision for Lot 1 EOC units; and Knowledge Point 5 supports Lot 2 procurement, Knowledge Point 6 supports USAF EOC decision, Knowledge Point 7 supports Lot 3 procurement and Knowledge Point 8 supports USN EOC decision. The program intends to meet the statutory requirements associated with Milestone B at Knowledge Point 3. In addition to the Knowledge Point reviews, Executive Steering Board reviews (also chaired by the MDA) are held at least monthly. Supporting these reviews, the associated engineering approach is designed to mitigate resulting risk by implementing a rolling-wave engineering progression based on the NAVAIR Systems Engineering Technical Review (SETR) process to enable detailed planning and decisions as the system matures. This process includes capstone SETR events that are tailored reviews using standard design review criteria. SETR 1.0 in FY 2014 provided a Systems Requirements Review. SETR 2.0 in FY 2015 provided a Preliminary Design Review level review of the system and supported Knowledge Point 2. SETR 3.0 in late 2015 provided a Critical Design Review (CDR) level review of the All Up Round in support of Knowledge Point 3, while SETR 4.0 in FY 2016 provided a CDR level review of the entire weapon system in support of Knowledge Point 4 in early FY 2017, along with flight test information.</p>		

E. Performance Metrics

The Knowledge Points are defined reviews with the Executive Steering Board comprised of Service Acquisition Executive, ASN(RDA) (delegated MDA) and the Deputy Director of DARPA to make program decisions at key points in the program life cycle in place of milestone reviews, but tailored to support the accelerated process. The acquisition program baseline was established at Knowledge Point 3.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev				Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPIF	Lockheed Martin Missile and Fire Control : Orlando, FL	517.355	216.034	Oct 2016	112.792	Oct 2017	89.185	Oct 2018	-		89.185	0.000	935.366	877.192
Product Development	C/CPFF	Boeing : St. Louis, MO	39.540	20.323	Oct 2016	3.254	Oct 2017	4.944	Oct 2018	-		4.944	0.000	68.061	65.561
Subtotal		556.895	236.357			116.046		94.129				94.129	0.000	1,003.427	N/A

Remarks

FY 2019 Lockheed Martin Company (LMCO) costs includes all integration and test efforts, including increased LRASM capability improvements development, by LMCO and associated sub-contractors to complete Knowledge Points 7 and 8 and the tailored qualification/flight test program.

FY 2019 Boeing costs includes software integration onto the B-1 and the F/A-18 E/F to maintain synchronization with system and hardware development. Software development tests on F/A-18 E/F and Systems Engineering Technical Review (SETR) 8.0 (USN EOC Readiness Review).

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Support	WR	NAWC AD : Patuxent River, MD	4.446	2.324	Oct 2016	2.303	Oct 2017	2.527	Nov 2018	-		2.527	0.000	11.600	-
Government Support	WR	NAWC WD : China Lake, CA	28.241	11.306	Oct 2016	10.442	Oct 2017	11.120	Nov 2018	-		11.120	0.000	61.109	-
Government Support	WR	NSWC : Various	3.107	0.291	Nov 2016	0.092	Nov 2017	0.063	Nov 2018	-		0.063	0.000	3.553	-
Development Support	C/FFP	NSMA : Washington, DC	11.982	5.570	Dec 2016	5.580	Dec 2017	6.762	Dec 2018	-		6.762	0.000	29.894	28.794
Development Support	MIPR	USAF : Various	0.546	0.425	Oct 2016	0.190	Oct 2017	0.000		-		0.000	0.000	1.161	-
Integrated Logistics Support	WR	NAWC AD : Patuxent River, MD	0.334	0.171	Oct 2016	0.176	Oct 2017	0.200	Nov 2018	-		0.200	0.000	0.881	-
Contractor Support	C/CPFF	JHU/APL : Laurel, MD	11.831	0.000		0.000		0.000		-		0.000	0.000	11.831	11.831
Contractor Support	C/FFP	Schafer Corporation : Arlington, VA	14.163	4.208	Oct 2016	3.719	May 2018	5.293	May 2019	-		5.293	0.000	27.383	25.883

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev				Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon							
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Mission Planning Support	C/CPFF	Northrup Grumman : Bethpage, NY	5.791	3.797	Oct 2016	0.400	Oct 2017	1.100	Oct 2018	-		1.100	0.000	11.088	10.188
Contractor Support	Various	Various : Various	7.479	0.639	Oct 2016	0.717	Oct 2017	0.931	Oct 2018	-		0.931	0.000	9.766	9.566
Development Support	Various	NRL : Various	0.691	0.885	Nov 2016	0.575	Nov 2017	0.443	Nov 2018	-		0.443	0.000	2.594	2.494
Development Support	C/FPIF	ONR : Arlington, VA	0.000	0.000		0.000		3.800	Dec 2018	-		3.800	0.000	3.800	3.800
Prior Yr Supp no longer funded in the FYDP	Various	Various : Various	2.800	0.000		0.000		0.000		-		0.000	0.000	2.800	2.800
Subtotal			91.411	29.616		24.194		32.239		-		32.239	0.000	177.460	N/A
Remarks															
FY 2019 Support costs consist of support from Government offices and Contractor Support experts associated with threat analysis, CONOPs, and Training and Tactical assessments in support of Knowledge Points 7 and 8, the developmental test program, the Quick Reaction Assessment (QRA), and tactics development supporting USN EOC. Schafer Corporation increased to reflect full funding for Option Year 3 and Option Year 4 in FY 2018 and FY 2019															
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NAWC WD : China Lake, CA	18.926	15.224	Oct 2016	13.180	Oct 2017	10.236	Nov 2018	-		10.236	0.000	57.566	-
Development Support	WR	NAWC AD : Patuxent River, MD	11.121	13.082	Oct 2016	3.071	Oct 2017	2.110	Nov 2018	-		2.110	0.000	29.384	-
Development Support	WR	NSWC : Various	0.131	0.210	Nov 2016	0.079	Nov 2017	0.081	Nov 2018	-		0.081	0.000	0.501	-
Development Support	WR	COTF : Norfolk, VA	0.107	0.100	Oct 2016	0.000		0.100	Dec 2018	-		0.100	0.000	0.307	-
Development Support	MIPR	USAF : Various	1.372	3.930	Oct 2016	1.106	Oct 2017	0.472	Oct 2018	-		0.472	0.000	6.880	-
Wind Tunnel Testing	MIPR	AEDC : Arnolds AFB, TN	4.153	0.000		0.000		0.600	Mar 2019	-		0.600	0.000	4.753	-
Subtotal			35.810	32.546		17.436		13.599		-		13.599	0.000	99.391	N/A
Remarks															
FY 2019 Test and Evaluation costs support flight testing, system qualifications, range time, and target costs needed for the F/A-18 E/F to support Knowledge Points 7 and 8, the developmental test program, and the Quick Reaction Assessment (QRA).															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev				Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon							
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Support	WR	NAWC AD : Patuxent River, MD	5.659	1.275	Oct 2016	1.311	Oct 2017	1.405	Nov 2018	-		1.405	0.000	9.650	-
Government Support	WR	NAWC WD : China Lake, CA	2.619	1.260	Oct 2016	1.207	Oct 2017	1.290	Nov 2018	-		1.290	0.000	6.376	-
Project Management Support	C/CPFF	NAWC AD : Patuxent River, MD	1.600	0.000		0.000		0.000		-		0.000	0.000	1.600	1.600
Travel	Various	NAWC AD : Patuxent River, MD	0.725	0.500	Oct 2016	0.500	Oct 2017	0.400	Oct 2018	-		0.400	0.000	2.125	-
Subtotal			10.603	3.035		3.018		3.095		-		3.095	0.000	19.751	N/A

Remarks
FY 2019 Management Services costs consist of Non-Headquarters Program Office Management team (Government labor and Contractor support services) required for the management of the program.

		Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		694.719	301.554		160.694		143.062		-		143.062	0.000	1,300.029	N/A

Remarks

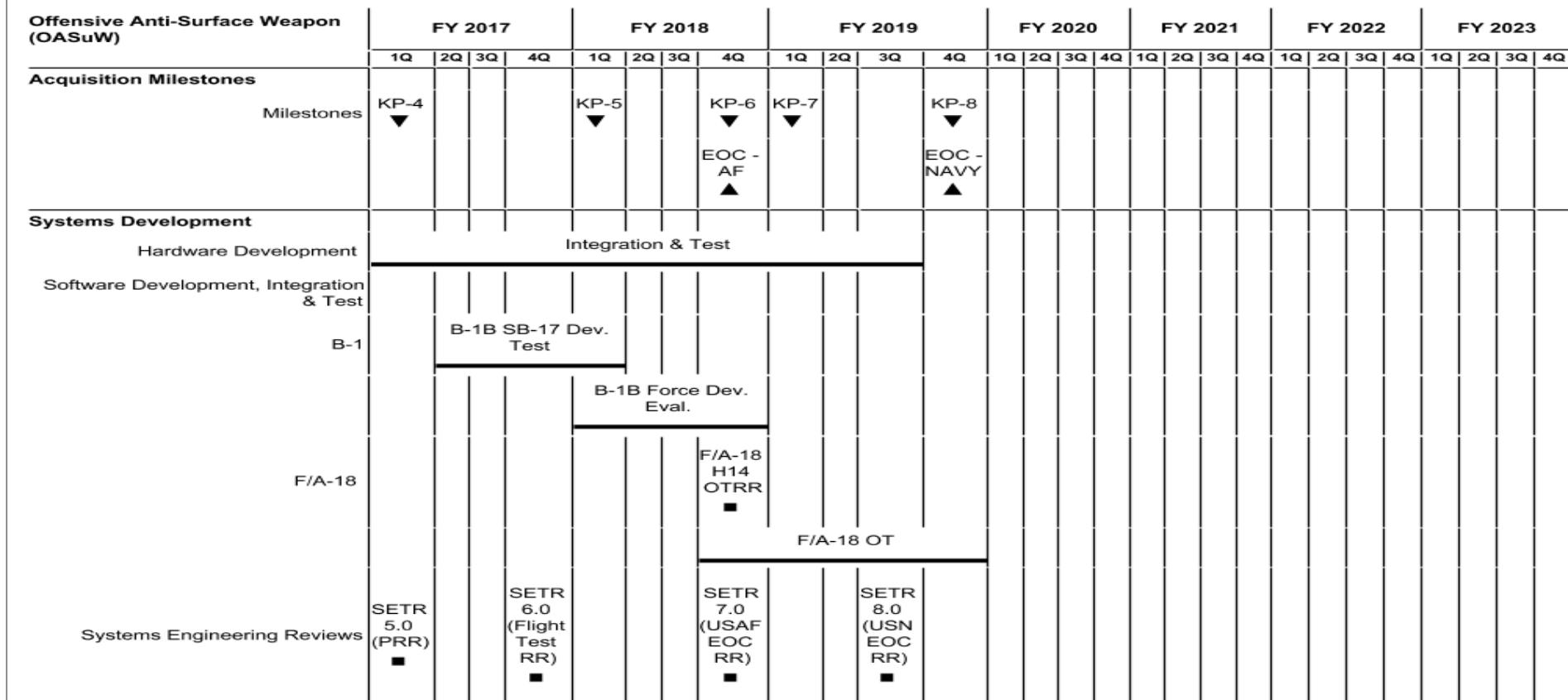
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0604786N / (U)Offensive Anti-Surface
Warfare Weapon Dev**Project (Number/Name)**3337 / Offensive Anti-Surface Warfare
(OASuW) Weapon

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

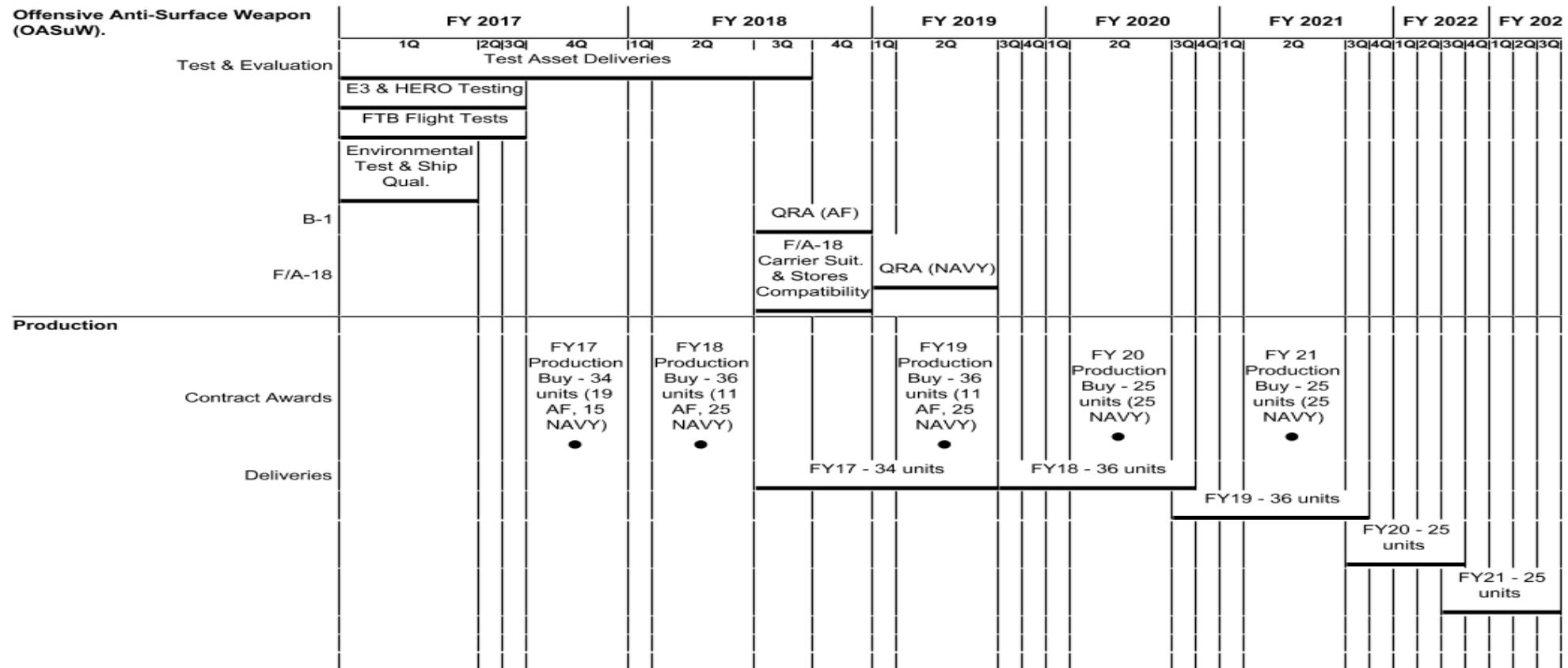
1319 / 4

R-1 Program Element (Number/Name)

PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev

Project (Number/Name)

3337 / Offensive Anti-Surface Warfare (OASuW) Weapon



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev	Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon		
Schedule Details				
Events by Sub Project	Start	End	Quarter	Year
Quarter	Year	Quarter	Year	
Offensive Anti-Surface Weapon (OASuW)				
Acquisition Milestones: Milestones: Knowledge Point 4	1	2017	1	2017
Acquisition Milestones: Milestones: Knowledge Point 5	1	2018	1	2018
Acquisition Milestones: Milestones: Knowledge Point 6	4	2018	4	2018
Acquisition Milestones: Milestones: Knowledge Point 7	1	2019	1	2019
Acquisition Milestones: Milestones: Knowledge Point 8	4	2019	4	2019
Acquisition Milestones: Milestones: Early Operational Capability (EOC) Air Force	4	2018	4	2018
Acquisition Milestones: Milestones: Early Operational Capability (EOC) Navy	4	2019	4	2019
Systems Development: Hardware Development: Integration & Test	1	2017	3	2019
Systems Development: B-1: B-1 SB-17 Software Development Test	2	2017	1	2018
Systems Development: B-1: B-1 Force Development Evaluation	1	2018	4	2018
Systems Development: F/A-18: F/A-18 H14 Operational Test Readiness Review	4	2018	4	2018
Systems Development: F/A-18: F/A-18 H14 Operational Test	4	2018	4	2019
Systems Development: Systems Engineering Reviews: System Engineering Technical Review 5.0 (Production Readiness Review)	1	2017	1	2017
Systems Development: Systems Engineering Reviews: System Engineering Technical Review 6.0 (Flight Test Readiness Review)	4	2017	4	2017
Systems Development: Systems Engineering Reviews: System Engineering Technical Review 7.0 (USAF EOC Readiness Review)	4	2018	4	2018
Systems Development: Systems Engineering Reviews: System Engineering Technical Review 8.0 (USN EOC Readiness Review)	3	2019	3	2019
Offensive Anti-Surface Weapon (OASuW).				
Test & Evaluation: Test Asset Deliveries	1	2017	3	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604786N / (U)Offensive Anti-Surface Warfare Weapon Dev	Project (Number/Name) 3337 / Offensive Anti-Surface Warfare (OASuW) Weapon		
Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Test & Evaluation: E3 & HERO Testing	1	2017	3	2017
Test & Evaluation: FTB Flight Tests	1	2017	3	2017
Test & Evaluation: Environmental Test & Ship Qualification	1	2017	1	2017
B-1: Quick Reaction Assessment Testing (AF)	3	2018	4	2018
F/A-18: Quick Reaction Assessment Testing (Navy)	1	2019	2	2019
F/A-18: F/A-18 Carrier Suitability & Stores Compatibility	3	2018	4	2018
Production: Contract Awards: FY17 Production Buy - 34 units (19 AF, 15 NAVY)	4	2017	4	2017
Production: Contract Awards: FY18 Production Buy - 36 units (11 AF, 25 NAVY)	2	2018	2	2018
Production: Contract Awards: FY19 Production Buy - 36 units (11 AF, 25 NAVY)	2	2019	2	2019
Production: Contract Awards: FY 20 Production Buy - 25 units (25 NAVY)	2	2020	2	2020
Production: Contract Awards: FY 21 Production Buy - 25 units (25 NAVY)	2	2021	2	2021
Production: Deliveries: FY17 Deliveries - 34 units	3	2018	2	2019
Production: Deliveries: FY18 Deliveries - 36 units	3	2019	3	2020
Production: Deliveries: FY19 Deliveries - 36 units	3	2020	3	2021
Production: Deliveries: FY 20 Deliveries - 25 units	3	2021	3	2022
Production: Deliveries: FY 21 Deliveries - 25 units	3	2022	3	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	119.690	7.658	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	127.348
3209: Joint Light Tactical Vehicle	119.690	7.658	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	127.348
Program MDAP/MAIS Code:												
Project MDAP/MAIS Code(s): 279												
Note												
The FY 2011 NDAA directed the Services to separate the Joint Light Tactical Vehicle (JLTV) program into distinct PEs to provide Congress with increased transparency and allow for more effective oversight. Transition of funding from PE 0603635M to PE 0605812M was effective beginning in FY 2013.												
Beginning in FY18, the program funding transitions from Program Element 0605812M Joint Light Tactical Vehicle (JLTV) EMD to Program Element 0605813M Joint Light Tactical Vehicle (JLTV) System Development and Demonstration as the program proceeds through the acquisition process.												
A. Mission Description and Budget Item Justification												
Funding supports the development and testing of the JLTV Family of Vehicles (FoV). JLTV is a joint program between the U.S. Army and the U.S. Marine Corps, of which the U.S. Army is the lead service. JLTV is a FoV capable of performing multiple mission roles designed to provide protected, sustained, and networked mobility for personnel and payloads across the full Range of Military Operations (ROMO). JLTV objectives include increased performance, protection, and payload over the current legacy HMMWV fleet, minimizing ownership costs by maximizing commonality, fuel efficiency and reliability. The commonality of components, maintenance procedures, training, etc, among vehicles is expected to be inherent in FoV solutions across mission variants to minimize total ownership cost. Unique service requirements have been minimized.												
B. Program Change Summary (\$ in Millions)					FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total			
Previous President's Budget					23.197	0.000	0.000	-	0.000			
Current President's Budget					7.658	0.000	0.000	-	0.000			
Total Adjustments					-15.539	0.000	0.000	-	0.000			
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments 					-	-	-	-	-			
					-1.687	0.000	-	-	-			
					-0.253	0.000	-	-	-			
					0.001	0.000	0.000	-	0.000			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD
• Congressional Directed Reductions Adjustments	-13.600 - - -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD				Project (Number/Name) 3209 / Joint Light Tactical Vehicle			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3209: Joint Light Tactical Vehicle	119.690	7.658	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	127.348
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 279												
Note Beginning in FY18, the program funding transitions from Program Element 0605812M Joint Light Tactical Vehicle (JLTV) EMD to Program Element 0605813M Joint Light Tactical Vehicle (JLTV) System Development and Demonstration as the program proceeds through the acquisition process.												
A. Mission Description and Budget Item Justification Funding supports the development and testing of the JLTV Family of Vehicles (FoV). JLTV is a joint program between the U.S. Army and the U.S. Marine Corps, of which the U.S. Army is the lead service. JLTV is a FoV capable of performing multiple mission roles designed to provide protected, sustained, and networked mobility for personnel and payloads across the full Range of Military Operations (ROMO). JLTV objectives include increased performance, protection, and payload over the current legacy HMMWV fleet, minimizing ownership costs by maximizing commonality, fuel efficiency and reliability. The commonality of components, maintenance procedures, training, etc, among vehicles is expected to be inherent in FoV solutions across mission variants to minimize total ownership cost. Unique service requirements have been minimized.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
Title: GFE, ILS, Facilities Documentation/Analysis and Support Engineering Articles:												
FY 2018 Plans: -Funding for the JLTV program transitions to PE 0605813M beginning FY18.												
FY 2019 Base Plans: N/A												
FY 2019 OCO Plans: N/A												
Title: Test and Evaluation Events and Analysis Articles:												
FY 2018 Plans:												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD				Project (Number/Name) 3209 I Joint Light Tactical Vehicle			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total						
-Funding for the JLTV program transitions to PE 0605813M beginning FY18.											
FY 2019 Base Plans: N/A											
FY 2019 OCO Plans: N/A											
Title: Program Management Support											
			Articles:								
FY 2018 Plans: -Funding for the JLTV program transitions to PE 0605813M beginning FY18.	1.718	0.000	0.000	0.000	0.000						
FY 2019 Base Plans: N/A											
FY 2019 OCO Plans: N/A											
Accomplishments/Planned Programs Subtotals						7.658	0.000	0.000	0.000	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Line Item											
• PMC/5095: 0605812M- JLTV	104.230	233.639	607.011	-	607.011	707.778	475.381	439.744	421.609	710.182	3,765.577
• OPA/D15603: JLTV (Army)	587.514	804.440	1,319.436	-	1,319.436	1,147.246	1,242.725	1,346.783	1,211.192	14,970.677	23,044.538
• RDTEA/VU9: 0605812A-JLTV (Army)	11.086	23.467	2.686	-	2.686	2.732	1.744	2.789	4.799	74.341	584.096
• RDT&E/0605813M: Joint Light Tactical Vehicle (Sys Dev & Dem)	0.000	20.710	2.260	-	2.260	2.122	0.026	0.024	0.022	Continuing	Continuing
Remarks											
D. Acquisition Strategy	Joint Light Tactical Vehicle (JLTV) is a Joint Service Program with the U.S. Army and U.S. Marine Corps as the two main components. The U.S. Army is the JLTV service lead.										

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD	Project (Number/Name) 3209 I Joint Light Tactical Vehicle
The JLTV Program entered the Production and Deployment Phase with the Acquisition Decision Memorandum authorization on 25 August 2015. With Milestone C approval, the LRIP fixed price contract was awarded to Oshkosh Defense LLC on 25 August 2015. This contract consists of a three year LRIP period with options for five additional years of FRP deliveries. JPO JLTV requested separately priced firm fixed price (FFP) option(s) for purchase of the Technical Data Package (TDP) with appropriate data rights to allow for possible future competition for production vehicles and spares.		
During the LRIP phase, JPO JLTV will continue to produce production vehicles for extensive Test and Evaluation activities to support a FRP decision. A ramp up of JLTV quantities will continue to support fielding to U.S. Army and USMC units once the FRP decision is achieved and allow the program to transition into Full Rate production.		
The JLTV program will continually monitor emerging technologies and capabilities through its partnerships with U.S. Army and USMC science and technology organizations as well as through industry market research and partnerships. At this time follow-on increments for technology insertion are undefined; the JLTV program will look for opportunities to implement increased capabilities throughout the system Life Cycle.		
E. Performance Metrics Milestone Reviews		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD				Project (Number/Name) 3209 / Joint Light Tactical Vehicle							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	52.642	0.000		0.000		0.000		-		0.000	0.000	52.642	-
		Subtotal	52.642	0.000		0.000		0.000		-		0.000	0.000	52.642	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Years Cumulative Funding	Various	Various : Various	8.475	0.000		0.000		0.000		-		0.000	0.000	8.475	-
System Integration	MIPR	SSC-A : Charleston, SC	0.000	1.339	Feb 2017	0.000		0.000		-		0.000	0.000	1.339	-
		Subtotal	8.475	1.339		0.000		0.000		-		0.000	0.000	9.814	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (Performance, RAM, Ballistic, Report Generation)	MIPR	Govt Proving Grounds-ARL : Aberdeen, MD	7.586	1.153	Jan 2017	0.000		0.000		-		0.000	0.000	8.739	-
Prior Years Cumulative Funding	Various	Various : Various	17.978	0.000		0.000		0.000		-		0.000	0.000	17.978	-
Developmental Test & Evaluation (Performance, RAM, Ballistic, Report Generation)	MIPR	Govt Proving Grounds : Various	7.508	2.073	Jan 2017	0.000		0.000		-		0.000	0.000	9.581	-
Developmental Test & Evaluation (Oversight)	WR	MCOTEA : Quantico, VA	1.224	0.200	Jan 2017	0.000		0.000		-		0.000	0.000	1.424	-
Live Fire Test & Evaluation	MIPR	ATC : Aberdeen, MD	7.210	0.695	Sep 2017	0.000		0.000		-		0.000	0.000	7.905	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD				Project (Number/Name) 3209 / Joint Light Tactical Vehicle								
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Developmental Test & Evaluation	C/FFP	CORVID : Mooresville, NC	1.313	0.480	May 2017	0.000		0.000		-		0.000	0.000	1.793	-	
		Subtotal	42.819	4.601		0.000		0.000		-		0.000	0.000	47.420	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Prior Years Cumulative Funding	Various	Various : Various	10.829	0.000		0.000		0.000		-		0.000	0.000	10.829	-	
Program Management Support	C/CPFF	Various : Various	2.908	1.268	Oct 2016	0.000		0.000		-		0.000	0.000	4.176	-	
Program Management Support	C/CPFF	CECOM/MITRE : Aberdeen Proving Ground, MD	1.130	0.150	Sep 2017	0.000		0.000		-		0.000	0.000	1.280	-	
Travel	Various	MCSC : Quantico, VA	0.887	0.300	Oct 2016	0.000		0.000		-		0.000	0.000	1.187	-	
		Subtotal	15.754	1.718		0.000		0.000		-		0.000	0.000	17.472	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				119.690	7.658		0.000		0.000		-		0.000	0.000	127.348	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

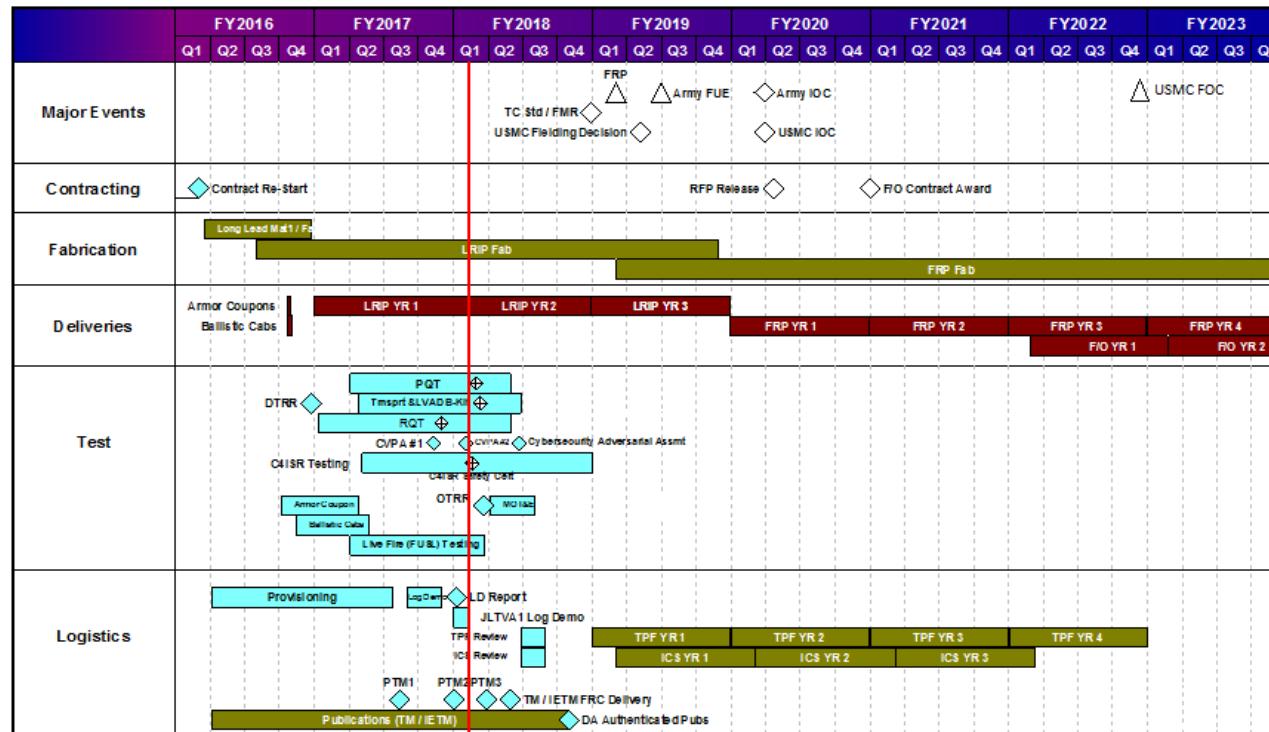
Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)
PE 0605812M I (U)Joint Light Tactical
Vehicle(JLTV) EMD

Project (Number/Name)
3209 *Joint Light Tactical Vehicle*



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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0605812M I (U)Joint Light Tactical Vehicle(JLTV) EMD	Project (Number/Name) 3209 / Joint Light Tactical Vehicle		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 3209</i>				
Requirements/Production Qualification Test		1	2017	2
Full Up Systems Level Test		1	2017	1
Logistics Demonstration		3	2017	1
Multi-Service Operation Test & Evaluation		2	2018	3
Full Rate Production Decision		1	2019	1
USMC Fielding Decision		2	2019	2
USMC Initial Operational Capability		1	2020	1

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0303354N / ASW Systems Development - MIP								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	36.543	9.110	8.278	8.889	-	8.889	10.007	9.188	9.367	10.557	Continuing	Continuing	
0490: Airborne Acoustic Intelligence (AAI)	36.543	9.110	8.278	8.889	-	8.889	10.007	9.188	9.367	10.557	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
The mission of Airborne ASW Intelligence (AAI) (CNO Project K-0416) is to provide advanced Anti-Submarine Warfare (ASW) capabilities through rapid development of new technology and prototype mechanisms for the collection of ASW related intelligence. This includes full spectrum intelligence collections and cataloging of current targets of interest. The program develops and swiftly deploys disruptive innovation to counter emerging threats in order to maintain the United States' current undersea warfare superiority. AAI employs the capability to quickly reconstruct and analyze passive and active measurements of submarine vulnerabilities providing actionable intelligence to fleet commanders. The AAI data collection program provides full spectrum intelligence data essential for the design and development of advanced sensors, weapon systems, environmental models, and tactical decision aids. AAI collection systems are installed and employed on uniquely configured aircraft, specially configured ground support facilities, ships, and other assets as required for the collection, processing, exfiltration, and dissemination of undersea intelligence. AAI includes recording systems, advanced detection and tracking systems, specially designed sensors, advanced processing systems and techniques, and specially derived tactics.													
This is a Military Intelligence Program (MIP).													
JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				9.110	8.278	8.967	-					8.967	
Current President's Budget				9.110	8.278	8.889	-					8.889	
Total Adjustments				0.000	0.000	-0.078	-					-0.078	
• Congressional General Reductions				-	-								
• Congressional Directed Reductions				-	-								
• Congressional Rescissions				-	-								
• Congressional Adds				-	-								
• Congressional Directed Transfers				-	-								
• Reprogrammings				-	-								
• SBIR/STTR Transfer				-	-								
• Rate/Misc Adjustments				0.000	0.000	-0.078	-					-0.078	

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP
Change Summary Explanation Technical: Not Applicable Schedule: Added Furious Krypton development starting in 1Q 2020.	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0303354N / ASW Systems Development - MIP				0490 / Airborne Acoustic Intelligence (AAI)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
0490: Airborne Acoustic Intelligence (AAI)	36.543	9.110	8.278	8.889	-	8.889	10.007	9.188	9.367	10.557	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The mission of Airborne ASW Intelligence (AAI)(CNO Project K-0416) is to provide advanced Anti-Submarine Warfare (ASW) capabilities through rapid development of new technology and prototype mechanisms for the collection of ASW related intelligence. This includes full spectrum intelligence collections and cataloging of current targets of interest. The program develops and swiftly deploys disruptive innovation to counter emerging threats in order to maintain the United States' current undersea warfare superiority. AAI employs the capability to quickly reconstruct and analyze passive and active measurements of submarine vulnerabilities providing actionable intelligence to fleet commanders. The AAI data collection program provides full spectrum intelligence data essential for the design and development of advanced sensors, weapon systems, environmental models, and tactical decision aids. AAI collection systems are installed and employed on uniquely configured aircraft, specially configured ground support facilities, ships, and other assets as required for the collection, processing, exfiltration, and dissemination of undersea intelligence. AAI includes recording systems, advanced detection and tracking systems, specially designed sensors, advanced processing systems and techniques, and specially derived tactics.												
This is a Military Intelligence Program (MIP).												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)												
Title: Systems Engineering / Aircraft Mods Active Acoustic Program Articles: FY 2018 Plans: Engineering support of Acoustic Intelligence (ACINT) Collection Suites for certified AAI collection platforms and management of full spectrum database. Engineering support for design upgrades to ACINT Collection Suites for certified AAI collection platforms. Evaluate additional P-8 aircraft sensor station for in-flight analysis of ACINT. Continue evaluation of Fleet software releases for Office of Naval Intelligence(ONI) certification aboard ASW collection platforms. Continued upgrades and development for unique airborne avionics and sensors. Continue fielding ACS kits in support of P-8A deployments. FY 2019 Base Plans: Engineering support of Acoustic Intelligence (ACINT) Collection Suites for certified AAI collection platforms and management of full spectrum database. Engineering support for design upgrades to ACINT Collection Suites for certified AAI collection platforms. Evaluate additional P-8 aircraft sensor station for in-flight analysis of ACINT.												
FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total								
1.670	1.551	1.399	0.000	1.399								
-	-	-	-	-								

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP	Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue evaluation of Fleet software releases for Office of Naval Intelligence(ONI) certification aboard ASW collection platforms. Continued upgrades and development for unique airborne avionics and sensors. Continue fielding ACS kits in support of P-8A deployments.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to Navy-wide efficiencies and rate adjustments.						
Title: Data Collection and Analysis FY 2018 Plans: Data collection support at Operational Wings. Ongoing collection of high interest acoustic and non-acoustic data in support of MASINT/ONI threat assessment requirements. Characterization, analysis and certification of the upgraded Fleet MASINT collection assets. Reduction, Analysis and Fleet Rapid Feedback. Conduct special operations support. Essential performance modeling and evaluation for advanced technology sensor systems design and Fleet tactics development. Develop post mission analysis hardware, software and processes in response to evolving enemy capabilities.		Articles: 1.085 -	1.035 -	1.044 -	0.000 -	1.044 -
FY 2019 Base Plans: Data collection support at Operational Wings. Ongoing collection of high interest acoustic and non-acoustic data in support of MASINT/ONI threat assessment requirements. Characterization, analysis and certification of the upgraded Fleet MASINT collection assets. Reduction, Analysis and Fleet Rapid Feedback. Conduct special operations support. Essential performance modeling and evaluation for advanced technology sensor systems design and Fleet tactics development. Develop post mission analysis hardware, software and processes in response to evolving enemy capabilities.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Fully funds data collection and analysis activities.						
Title: Active Measurement Validation FY 2019 OCO Plans: N/A		Articles: 0.150 -	0.138 -	0.143 -	0.000 -	0.143 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP	Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Active Measurement Validation of targets of interest. Provides the acoustic analysis of echo characterization (which includes: signal excess measurements, peak frequency, trend analysis and pulse duration measurements) and target strength.						
FY 2019 Base Plans: Active Measurement Validation of targets of interest. Provides the acoustic analysis of echo characterization (which includes: signal excess measurements, peak frequency, trend analysis and pulse duration measurements) and target strength.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: 0.005 increase is due to refined cost estimate.						
Title: Navy Underwater Active Multiple Ping (NUAMP) Product Development FY 2018 Plans: Continue sonic frequency design, development, integration and test for additional sonic frequencies of the NUAMP sonobuoy family. FY 2019 Base Plans: Continue sonic frequency design, development, integration and test for remaining sonic frequencies of the NUAMP sonobuoy family. FY 2019 OCO Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: Decrease due to Navy-wide efficiencies and rate adjustments.	Articles: 6.205 - -	5.554 - -	5.103 - -	0.000 - -	5.103 - -	
Title: Passive Extended Range Sonobuoy System (PERSS) Product Development FY 2018 Plans:	Articles: 0.000 - -	0.000 - -	1.200 - -	0.000 - -	1.200 - -	

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP	Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base
N/A				FY 2019 OCO
FY 2019 Base Plans: Continue development of disruptive innovative sensors by experimenting and prototyping in a high fidelity and realistic operating environment. Transition various laboratory sonobuoy subsystems by proving the subsystems maturity in real world environments. Perform risk reduction technology demonstration efforts using high gain beamforming sonobuoy transducer assemblies.				
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Funds Passive Extended Range Sonobuoy System (PERSS) Product Development.				
Accomplishments/Planned Programs Subtotals				9.110 8.278 8.889 0.000 8.889
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy Airborne ASW Intelligence (AAI) is a CNO Special Project. The included technology developments are primarily in-house with contractor participation through existing vehicles.				
E. Performance Metrics Provide engineering to support Sound Pressure Level (SPL) recording. Provide data collection support at Operation Wings. Perform Active Measurement Validation of targets of interest.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP				Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Active Measurement Validation	WR	NAWCAD : PATUXENT RIVER, MD	1.743	0.150	Dec 2016	0.138	Dec 2017	0.143	Dec 2018	-		0.143	Continuing	Continuing	Continuing
Ancillary Hdw Development	WR	NAWCAD : PATUXENT RIVER, MD	5.139	0.875	Dec 2016	0.500	Dec 2017	0.500	Dec 2018	-		0.500	Continuing	Continuing	Continuing
Ancillary Hdw Development Cont	Various	VARIOUS : VARIOUS	0.947	0.599	Dec 2016	0.585	Dec 2017	0.593	Dec 2018	-		0.593	Continuing	Continuing	Continuing
Systems Eng	WR	NAWCAD : PATUXENT RIVER, MD	4.891	0.927	Dec 2016	0.665	Dec 2017	0.676	Dec 2018	-		0.676	Continuing	Continuing	Continuing
Systems Eng	Various	VARIOUS : VARIOUS	1.522	0.743	Dec 2016	0.793	Dec 2017	0.723	Dec 2018	-		0.723	Continuing	Continuing	Continuing
Primary Hdw Development	SS/CPIF	ERAPSCO : FT. WAYNE IN	18.525	5.268	Dec 2016	5.347	Dec 2017	6.004	Dec 2018	-		6.004	14.080	49.224	49.224
Subtotal			32.767	8.562		8.028		8.639		-		8.639	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Mgt & Prof Spt Svcs (Non-FFRDC)	Various	VARIOUS : VARIOUS	3.154	0.319	Dec 2016	0.202	Dec 2017	0.205	Dec 2018	-		0.205	Continuing	Continuing	Continuing
Contractor Eng Spt	Various	VARIOUS : VARIOUS	0.407	0.181	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Travel	Various	VARIOUS : VARIOUS	0.184	0.048	Dec 2016	0.048	Dec 2017	0.045	Dec 2018	-		0.045	Continuing	Continuing	Continuing
Prior year Mgmt Svcs no longer funded in the FYDP	Various	VARIOUS : VARIOUS	0.031	0.000		0.000		0.000		-		0.000	0.000	0.031	-
Subtotal			3.776	0.548		0.250		0.250		-		0.250	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy									Date: February 2018	
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP			Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)				
	Prior Years	FY 2017		FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	36.543	9.110		8.278	8.889	-	8.889	Continuing	Continuing	N/A
Remarks										

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity 1319 / 4												R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP				Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)										
Proj: 0490 Airborne Acoustic Intelligence (AAI)	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022					
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		
Systems Engineering													P-3/P-8/MH-60R Avionics Suite													
Sys Eng Tactical Acoustic Processor (TAPS)													TAPS													
Product Development													Furious Krypton													
													PERSS													
													Data Collection and Analysis													
													Active Target Strength Sensor Processing Development (NUAMP)													
Test & Evaluation													NUAMP Integrated Testing													
Airborne Avionics Deliveries																										
Prototypes	189 ▼												219 ▼				250 ▼				180 ▼				180 ▼	
	236 ▼																								180 ▼	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0303354N / ASW Systems Development - MIP	Project (Number/Name) 0490 / Airborne Acoustic Intelligence (AAI)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj: 0490 Airborne Acoustic Intelligence (AAI)				
Systems Engineering: P-3/P-8 Avionics Suite: P-3/P-8/MH-60R Avionics Suite	1	2017	4	2023
Sys Eng Tactical Acoustic Processor (TAPS): Sys Eng Tactical Acoustic Processor (TAPS)	1	2017	4	2023
Product Development: Furious Krypton Development	1	2020	4	2023
Product Development: Passive Extended Range Sonic Sensor	1	2019	4	2023
Product Development: Data Collection and Analysis	1	2017	4	2023
Product Development: Active Target Strength sensor processing development	1	2017	4	2023
Test & Evaluation: Technical Evaluation	1	2017	4	2023
Prototypes: Prototype 3	2	2017	2	2017
Prototypes: Prototype 4	2	2017	2	2017
Prototypes: Prototype 5	2	2018	2	2018
Prototypes: Prototype 6	2	2019	2	2019
Prototypes: Prototype 7	2	2020	2	2020
Prototypes: Prototype 8	2	2021	2	2021
Prototypes: Prototype 9	2	2022	2	2022
Prototypes: Prototype 10	2	2023	2	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	0.000	0.000	7.979	25.291	-	25.291	26.770	26.066	24.125	61.741	Continuing	Continuing	
3135: USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV	0.000	0.000	4.978	20.438	-	20.438	26.768	26.066	24.125	61.741	Continuing	Continuing	
3427: KMAX Experimentation and Support	0.000	0.000	3.001	4.853	-	4.853	0.002	0.000	0.000	0.000	0.000	7.856	

A. Mission Description and Budget Item Justification

This program element provides for development and capability requirements for Advanced Tactical Unmanned Aerial Vehicles in support of expeditionary efforts. Projects are Joint Military Intelligence Programs.

Project 3135 - This project provides for the early trade studies, analysis, experimentation, and concept refinement for the Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) with Vertical/Short Take-Off and Vertical Landing (V/STOVL) capability. These MUX efforts will include maturing key technologies and rapid prototyping to inform a future MUX program of record. Objective capabilities will include strike and cargo resupply. Provides USMC with MUX operational capability in FY26.

Project 3427 - This project provides for experimentation and support of the CQ-24A Cargo UAS (commonly referred to as KMAX). CQ-24A will be used to specifically inform the unmanned cargo resupply requirements of future programs of record, to include MUX. Experimentation includes payloads/sensor integration, control station integration, Concept of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTP) development. These experimentation efforts inform program capability documents and support other military exercises, and advance technologies needed for the future MUX POR.

Cost estimate for Cost to Complete and Total Cost for both project units are being developed and will be promulgated in a future budget request.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy					Date: February 2018
Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System			
B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
Previous President's Budget		0.000	7.979	10.385	-
Current President's Budget		0.000	7.979	25.291	-
Total Adjustments		0.000	0.000	14.906	-
• Congressional General Reductions		-	-		
• Congressional Directed Reductions		-	-		
• Congressional Rescissions		-	-		
• Congressional Adds		-	-		
• Congressional Directed Transfers		-	-		
• Reprogrammings		-	-		
• SBIR/STTR Transfer		-	-		
• Rate/Misc Adjustments		0.000	0.000	14.906	-
Change Summary Explanation					
Schedule: Project 3135 - Updated to reflect MUX experimentation requirements. Project 3427 - Not applicable					
Technical: Not applicable					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System				3135 I USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3135: USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV	0.000	0.000	4.978	20.438	-	20.438	26.768	26.066	24.125	61.741	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding provides for the early trade studies, analysis, experimentation, key technology maturation, rapid prototyping, and concept refinement for the Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) with Vertical/Short Take-Off and Vertical Landing (V/STOVL) capability. The MUX UAV supports Expeditionary Force 21 Operating Concepts and the 2017 Marine Aviation Plan (AvPlan) requires an advanced, multi-mission ship-based Group 5 UAS in support of Marine Expeditionary Force/Marine Expeditionary Brigade-sized MAGTF to address future capability gaps. The future MUX UAV system will provide a weaponized, payload flexible, shipboard capable/expeditionary system that is runway independent for all weather, long range/persistence, operations from the sea in a contested environment. This next generation UAV capability will have far greater range, endurance, altitude, and payload capability than the current conventional VTOL technology can provide from air capable ships. The MUX system Initial Capabilities Document (ICD) was approved in Oct 2016. The Material Development Decision and Analysis of Alternatives (AOA) is planned to start in FY18. Rapid prototyping strategies are also being pursued by the USMC to meet an early operational need date.

This effort will continue to inform program scope, phasing, and cost for development of the MUX capability. Funding in FY19 will also be used to reduce overall MUX program cost by leveraging other technology demonstrator developmental programs; such as the US Army Aviation and Missile Research, Development, and Engineering Center (AMRDEC) Joint Multi-Role Technology Demonstrator (JMR-TD) and Defense Advanced Research Project Agency (DARPA) TERN which both end in FY18, allowing for continued technical maturation effort, rapid prototyping, and smooth transition to a MUX POR.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: MUX Studies, Analysis, Experimentation and Concept Refinement Articles:	0.000	3.650	18.274	0.000	18.274
FY 2018 Plans: Provides funding for Government and industry teams for pre-Milestone A activities including industry inquiries, aircraft trade studies, concept refinement, requirements/payload analysis for meeting mission requirements to inform the MUX POR. Supports development of the MUX Concept of Operations and draft Capability Development Document (CDD). Provides funding for experimentation with advanced concept demonstrator UAVs such as USMC CQ-24A Cargo UAS and DARPA/ONR developed Tern Medium Altitude Long Endurance (MALE) UAS, along with other tactical UAV/payload/control station demonstrator efforts to help inform performance requirements, initial Key Performance Parameters (KPP), CONOPS, concepts, tactics, doctrine,	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System	Project (Number/Name) 3135 I USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
and the future MUX program of record. Provides funding for engineering architecture assessments (aircraft and payloads) to establish specific areas the government will function as the systems integrator. This will inform a future POR in order to reduce life cycle costs.						
FY 2019 Base Plans: Provides funding for Government and industry teams for acquisition activities including industry inquiries, aircraft trade studies, concept refinement, requirements/payload analysis, and rapid prototyping efforts related to the MUX POR. Supports continued development of the MUX Concept of Operations and draft CDD. Provides funding for experimentation with advanced concept demonstrator UAVs such as USMC CQ-24A Cargo UAS, DARPA/ONR developed Tern UAS, and US Army AMRDEC JMR-TD aircraft projects, along with other tactical UAV/payload/control station demonstrator efforts, to help inform tactical unmanned system performance requirements, initial KPP, CONOPS, concepts, tactics, doctrine, the future MUX program of record, and support rapid prototyping efforts. Provides funding for engineering architecture assessments (aircraft and payloads) to establish specific areas where the government will function as the systems integrator.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from \$3.650M to \$18.274M results from additional industry capability RFIs and trade studies to support a future program of record.						
Title: Technical and Engineering Services Articles:		0.000	1.328	2.164	0.000	2.164
FY 2018 Plans: Initiate and provide Government Engineering support, Contractor support, Program support and travel for execution of MUX studies, experimentation, and concept refinement and for pre-MS A related acquisition activities to support the future MUX program of record.		-	-	-	-	-
FY 2019 Base Plans: Provide Government Engineering support, Contractor support, Program support and travel for execution of						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System	Project (Number/Name) 3135 I USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each) MUX studies, experimentation, rapid prototyping, and concept refinement and for pre-MS A related acquisition activities to support the future MUX program of record.	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO
FY 2019 OCO Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: Increase of \$1.328M to \$2.164M results from increased support for government engineering and industry developmental oversight.	Accomplishments/Planned Programs Subtotals	0.000	4.978	20.438
		0.000	4.978	20.438
C. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
D. Acquisition Strategy A Material Development Decision is anticipated in FY18. The MUX program will leverage technology of unmanned tactical aviation programs, including DARPA/ONR concept demonstrator UAV S&T programs, US Army AMRDEC JMR-TD aircraft projects, OEM internally funded UAV prototypes when available, existing tactical unmanned technologies, and promising new industry design concepts that result from industry trade studies. The government will develop and award study contracts as required to support program activities and analysis efforts. Assessment of available technology from existing S&T efforts and review of industry inquiries / study contracts will be used to determine the optimum MUX strategy to meet the Initial Operational Capability needs, as well as, a potentially Early Operational Capability which may be met through available rapid prototyping processes. The MUX POR intends to have the Government functioning as the system integrator for the development and sustainment of the program to reduce life cycle costs.				
E. Performance Metrics Performance metrics include successful completion of Trade Studies; successful development of a CONOPS and draft CDD, identification of material solutions for concept refinement, and analysis of architectures.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System						Project (Number/Name) 3135 I USMC MUX Medium Altitude - Long Endurance (MALE) Group 5 UAV			
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MUX Studies and Experimentation	Various	TBD : TBD	0.000	0.000		1.500	Jan 2018	15.599	Nov 2018	-		15.599	Continuing	Continuing	Continuing
Requirements Analysis and Engineering Assessments	WR	Various : Various	0.000	0.000		2.150	Jan 2018	2.675	Nov 2018	-		2.675	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		3.650		18.274		-		18.274	Continuing	Continuing	N/A
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.635	Jan 2018	1.034	Nov 2018	-		1.034	0.000	1.669	-
Program Management Support	Various	Various : Various	0.000	0.000		0.600	Jan 2018	1.050	Nov 2018	-		1.050	0.000	1.650	-
Travel	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.093	Jan 2018	0.080	Nov 2018	-		0.080	0.000	0.173	-
Subtotal			0.000	0.000		1.328		2.164		-		2.164	0.000	3.492	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		4.978		20.438		-		20.438	Continuing	Continuing	N/A
Remarks															

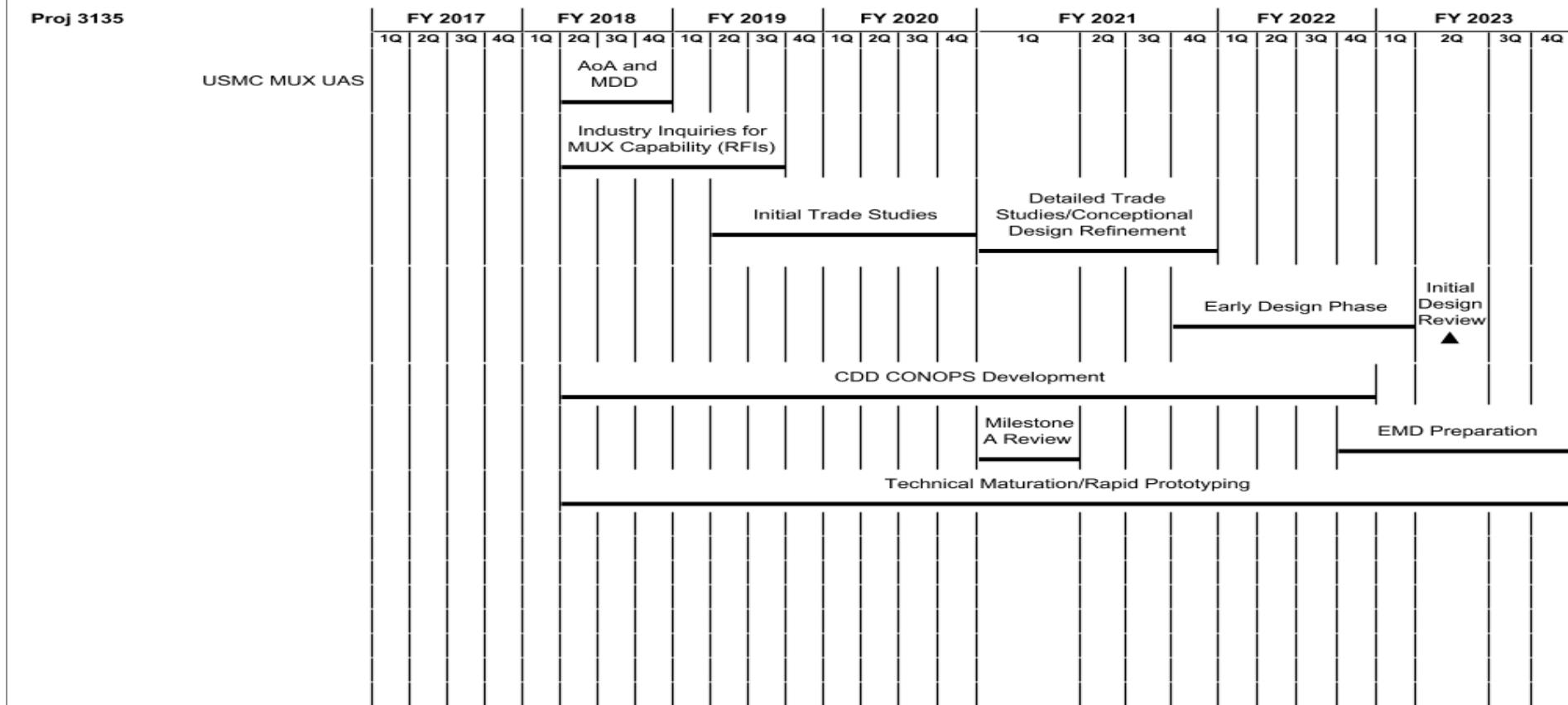
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)PE 0304240M I (U)Advanced Tactical
Unmanned Aircraft System**Project (Number/Name)**3135 I USMC MUX Medium Altitude - Long
Endurance (MALE) Group 5 UAV

2019PB - 0304240M - 3135

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical <i>Unmanned Aircraft System</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3135				
USMC MUX UAS: Analysis of Alternatives and Material Development Decision (AoA & MDD)	2	2018	4	2018
USMC MUX UAS: Acquisition Milestone: Industry Inquiries for MUX Capability (RFIs)	2	2018	3	2019
USMC MUX UAS: Acquisition Milestone: Initial Trade Studies	2	2019	4	2020
USMC MUX UAS: Acquisition Milestone: Detailed Trade Studies/Conceptional Design Refinement	1	2021	4	2021
USMC MUX UAS: Acquisition Milestone: Early Design Phase	4	2021	1	2023
USMC MUX UAS: Acquisition Milestone: Initial Design Review	2	2023	2	2023
USMC MUX UAS: Acquisition Milestone: CDD CONOPS Development	2	2018	4	2022
USMC MUX UAS: Acqusition Milestone: Engineering Manufacturing & Developoment	4	2022	4	2023
USMC MUX UAS: Acquisition Milestone: Milestone A Review	1	2021	1	2021
USMC MUX UAS: Acquisition Milestone: Technical Maturation,UAV Experimentation, Rapid Prototyping	2	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System				3427 I KMAX Experimentation and Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3427: KMAX Experimentation and Support	0.000	0.000	3.001	4.853	-	4.853	0.002	0.000	0.000	0.000	0.000	7.856
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding provides for experimentation for unmanned cargo operations and includes complementary Intelligence, Surveillance, and Reconnaissance (ISR), payloads, advanced sensors, autonomy; efforts to refine requirements and concept of operations (CONOPS); and support of future unmanned programs of record, such as Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX).

The CQ-24A Cargo UAS is a unique, unmanned, sling-load capable aircraft that has had demand signals including moving cargo in permissive environments (e.g. food, fuel, medicine), combatting forest fires in the United States (specifically at night) when manned aircraft don't fly due to safety restrictions, and flying to locations that present dangerous or deadly conditions to humans (such as biological threats or radiation hazards).

The program's 2 Marine Corps CQ-24A were successfully utilized in Afghanistan to support urgent operational needs in that theater of operations. The 2 CQ-24A aircraft and ground control system require contractor services to operate. Utilization of existing CQ-24A systems is an efficient risk reduction method.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: CQ-24A Cargo UAS Experimentation and Support Services	0.000	2.091	3.849	0.000	3.849
Articles:	-	-	-	-	-

FY 2018 Plans:
Provides funding for government and industry teams to operate aircraft in support of tactics development and fleet experimentation and modify aircraft with payloads to support requirements refinement, to include future MUX requirements. Payloads may include sensors, weapons, and systems to support extended range operations. Provides funding for engineering architecture assessments (aircraft and payloads) to establish areas where the government will function as the systems integrator for a program of record, in order to reduce life cycle costs.

FY 2019 Base Plans:
Provides funding for government and industry teams to operate aircraft in support of tactics development and fleet experimentation and modify aircraft with payloads to support requirements refinement, to include future MUX requirements. Payloads may include sensors, weapons, autonomy, and systems to support unique cargo

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System	Project (Number/Name) 3427 I KMAX Experimentation and Support				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
requirements envisioned for MUX or other specialty mission areas that this unique CQ-24A DOD high-value asset can provide.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from \$2.091M to \$3.849M results from additional tactics development and experimentation flight hours for the program.						
Title: Technical and Engineering Services FY 2018 Plans: Initiate and provide government engineering support, contractor support, program support and travel for execution of CQ-24A Cargo UAS experimentation and concept refinement for study products and acquisition activities to support future programs of record, to include MUX.		Articles: 0.000 - - -	0.910 - - -	1.004 - - -	0.000 - - -	1.004 - - -
FY 2019 Base Plans: Provide government engineering support, contractor support, program support and travel for execution of CQ-24A Cargo UAS experimentation and concept refinement for study products and acquisition activities to support future programs of record, to include MUX.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from \$0.910M to \$1.004M results from engineering and technical requirements to support experimentation and developmental oversight.						
Accomplishments/Planned Programs Subtotals		0.000	3.001	4.853	0.000	4.853
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy	Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical <i>Unmanned Aircraft System</i>	Project (Number/Name) 3427 I KMAX Experimentation and Support
D. Acquisition Strategy The CQ-24A Cargo UAS experimentation and support activities will be contracted through a sole source contract with the aircraft prime vendor in order to support continued experimentation through FY19. It is envisioned that support will continue beyond FY19/20 to align with the MUX program of record concept refinement phase. Other U.S. Government agencies have expressed interest in using these CQ-24A Cargo UAS assets to fight forest fires (at night) in the Midwest. CQ-24A can be made available for experimentation of autonomous fire-fighting through other agency funding (if available).		
E. Performance Metrics Performance metrics include successful completion of technical demonstration with published reports and CONOPS updates, along with inputs to unmanned cargo re-supply requirements for capability documents and performance specifications.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical Unmanned Aircraft System				Project (Number/Name) 3427 I KMAX Experimentation and Support								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
CQ-24A Cargo UAS Experimentation	C/CPFF	Lockheed Martin : MCAS Yuma, AZ	0.000	0.000		1.511	Jan 2018	3.239	Mar 2019	-		3.239	0.000	4.750	4.750	
Requirements and Analysis, and Engineering Assessments	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.580	Jan 2018	0.610	Mar 2019	-		0.610	0.000	1.190	1.190	
Subtotal			0.000	0.000		2.091		3.849		-		3.849	0.000	5.940	N/A	
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Govt Engineering Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.410	Jan 2018	0.474	Nov 2018	-		0.474	0.000	0.884	-	
Program Management Support	Various	Various : Various	0.000	0.000		0.445	Jan 2018	0.450	Nov 2018	-		0.450	0.000	0.895	-	
Travel	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.055	Jan 2018	0.080	Nov 2018	-		0.080	0.000	0.135	-	
Subtotal			0.000	0.000		0.910		1.004		-		1.004	0.000	1.914	N/A	
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		3.001		4.853		-		4.853	0.000	7.854	N/A
Remarks																

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240M I (U)Advanced Tactical <i>Unmanned Aircraft System</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3427				
Acquisition Milestones: Experimentation and concept refinement of USMC CONOPS, tactics, and doctrine	1	2018	1	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	9.300	-	9.300	14.400	0.000	0.000	0.000	0.000	23.700
3429: TERN UAS	0.000	0.000	0.000	9.300	-	9.300	14.400	0.000	0.000	0.000	0.000	23.700
A. Mission Description and Budget Item Justification												
This program element provides for the continued maturation and experimentation of Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV) Concept Demonstrator to assess military utility of this technology to meet Navy and Battle Group Commander Warfighting gaps when executing Distributed Maritime Operations. The MALE UAV Technology Demonstrator will also inform requirements for an aviation family of systems to support the Future Surface Combatant (FSC). This project is a Military Intelligence Program.												
Project 3429 - This project provides for trade studies, analysis, and continued testing, experimentation, and concept refinement to inform a long term solution for aviation support to Distributed Maritime Operations. A candidate technological concept is being designed by Defense Advanced Research Projects Agency (DARPA) and the Office of Naval Research (ONR) with additional funding provided by the Navy to further mature and assess the technology for Navy missions in a ship based environment. The DARPA/ONR technology concept is a Tactically Exploited Reconnaissance Node (TERN) program and will be the basis for MALE maturation and experimentation. The project name will be revised in the next budget submission.												
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Previous President's Budget				0.000	0.000	0.000	-	0.000				
Current President's Budget				0.000	0.000	9.300	-	9.300				
Total Adjustments				0.000	0.000	9.300	-	9.300				
<ul style="list-style-type: none"> • Congressional General Reductions • Congressional Directed Reductions • Congressional Rescissions • Congressional Adds • Congressional Directed Transfers • Reprogrammings • SBIR/STTR Transfer • Rate/Misc Adjustments 				-	-	-	-	-				
				0.000	0.000	9.300	-	9.300				
Change Summary Explanation												
Schedule:												
Project 3429 - Establishes the MALE (TERN) project unit.												
Technical: Not applicable												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
1319 / 4					PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System				3429 / TERN UAS			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3429: TERN UAS	0.000	0.000	0.000	9.300	-	9.300	14.400	0.000	0.000	0.000	0.000	23.700
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The goal of this program is to develop a Concept Demonstrator UAV, and perform technical demonstration of a Medium-Altitude, Long-Endurance Unmanned Aerial Vehicle (MALE UAV) capability from smaller ships. The program will demonstrate the technology for launch and recovery of large unmanned aircraft capable of providing persistent 24/7 Intelligence, Surveillance, and Reconnaissance (ISR) and strike capabilities at long radius orbits. Extending the ISR/strike radius while simultaneously increasing time on station beyond current capabilities from smaller ships will enable novel operational concepts including maritime surveillance and responsive, persistent deep overland ISR and strike, without requirement for forward basing. To achieve these goals, the program will investigate new concepts for aircraft launch and recovery, aircraft logistics and maintenance, and aircraft flight in regimes associated with maritime operating conditions.

MALE technologies have been under development by the Defense Advanced Research Projects Agency (DARPA) and the Office of Naval Research to prove basic capability; the Navy will fund mission utility assessments and envelope expansion and to assess this technology's ability to meet Navy and COCOM warfighting gaps. The MALE UAV Technology Demonstrator will also inform requirements for an aviation family of systems to support the Future Surface Combatant (FSC) POR and Distributed Maritime Operations.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: MALE (TERN) UAV Technical Maturation and Experimentation	0.000	0.000	8.350	0.000	8.350
Articles:	-	-	-	-	-
FY 2018 Plans: N/A					
FY 2019 Base Plans: The funding provides the Government and industry teams for continued aircraft trade studies, concept refinement, technology maturation, aircraft experimentation and testing, envelope expansion, and potential payload integration for meeting Navy mission requirements to inform the Navy's future Family of Systems (FOS). These efforts will also help refine objective performance requirements, initial Key Performance Parameters (KPP), CONOPS, concepts, tactics, doctrine, and reduce risk for the future ship-based UAV FOS. Provides architecture assessments for integrating the MALE ground and air segments to support interoperability with Navy					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018				
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System	Project (Number/Name) 3429 / TERN UAS				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							
		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Common Control System (CCS). Other UAVs, such as MQ-8, may be used as an additional technology platform for maturation and experimentation efforts.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from \$0.000M to \$8.350M results from a new start project unit.							
Title: Technical and Engineering Services		Articles: -	0.000	0.000	0.950	0.000	0.950
FY 2018 Plans: N/A			-	-	-	-	-
FY 2019 Base Plans: Initiate and provide Government engineering support, contractor support, program support and travel for continued experimentation.							
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from \$0.000M to \$0.950M results from a new start project unit.							
Accomplishments/Planned Programs Subtotals			0.000	0.000	9.300	0.000	9.300
C. Other Program Funding Summary (\$ in Millions)							
N/A							
Remarks							
D. Acquisition Strategy							
The program will continue experimentation efforts leveraging existing DARPA/ONR contracts targeted at Navy unique mission applications.							
E. Performance Metrics							
Performance metrics include successful completion of trade studies; successful demonstration of the minimum design criteria identified in the contracts, and ability to launch and recover in a sea-based environment.							

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System						Project (Number/Name) 3429 / TERN UAS				
Product Development (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
MALE (TERN) UAV Technical Maturation & Experimentation	C/CPIF	Northrop Grumman : San Diego, CA	0.000	0.000		0.000		6.900	Jan 2019	-		6.900	10.800	17.700	17.700	
Requirements, Analysis, and Engineering Assessments	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		1.450	Oct 2018	-		1.450	1.890	3.340	3.340	
Subtotal		0.000	0.000		0.000		8.350		-		8.350	12.690	21.040	N/A		
Test and Evaluation (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Range Cost	WR	NAWCWD : Point Mugu, CA	0.000	0.000		0.000		0.300	Nov 2018	-		0.300	0.900	1.200	-	
Subtotal		0.000	0.000		0.000		0.300		-		0.300	0.900	1.200	N/A		
Management Services (\$ in Millions)						FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total		
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.310	Oct 2018	-		0.310	0.470	0.780	-	
Program Management Support	Various	Various : Various	0.000	0.000		0.000		0.250	Oct 2018	-		0.250	0.250	0.500	-	
Travel	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		0.090	Nov 2018	-		0.090	0.090	0.180	-	
Subtotal		0.000	0.000		0.000		0.650		-		0.650	0.810	1.460	N/A		
				Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals				0.000	0.000		0.000		9.300		-		9.300	14.400	23.700	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy							Date: February 2018		
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System			Project (Number/Name) 3429 / TERN UAS			
	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Remarks									

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																	Date: February 2018								
Appropriation/Budget Activity								R-1 Program Element (Number/Name)								Project (Number/Name)									
1319 / 4								PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System								3429 / TERN UAS									
Proj 3429	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
MALE (Tern) UAS Maturation and Experimentation									Envelope Expansion and Flight Testing																
													GCS Demonstration												
													Payload Integration and Experimentation												
													Ground and Deck-handling Equipment Demonstrations												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy				Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304240N / (U)Advanced Tactical Unmanned Aircraft System	Project (Number/Name) 3429 / TERN UAS		
Schedule Details				
Events by Sub Project		Start		End
		Quarter	Year	Quarter
<i>Proj 3429</i>				
MALE (TERN) UAS Maturation and Experimentation: Envelope Expansion and Flight Testing		1	2019	2
MALE (TERN) UAS Maturation and Experimentation: Ground Control System Demonstration		4	2019	2
MALE (TERN) UAS Maturation and Experimentation: Payload Integration and Experimentation		3	2019	2
MALE (TERN) UAS Maturation and Experimentation: Ground and Deck-handling Equipment Demonstrations		3	2019	2

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy											Date: February 2018		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)								
1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0304270N / Electronic Warfare Development - MIP								
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
Total Program Element	4.531	0.437	0.527	0.466	-	0.466	0.552	0.569	0.571	0.598	Continuing	Continuing	
2260: Specific Emitter ID	4.531	0.437	0.527	0.466	-	0.466	0.552	0.569	0.571	0.598	Continuing	Continuing	
A. Mission Description and Budget Item Justification													
This project supports systems development and collection of Specific Emitter Identification (SEI) information from National Technical Means (NTM) to track commercial ships over 200 gross registered tons world-wide. Research and development will cover improvements and enhancements to Electronic Intelligence technology. This will include improved/next generation SEI technology for miniaturization and automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals. Propagation in a multi-path signal environment will also be assessed. All work on this project will be undertaken in pursuit of goals stated by the Office of Naval Intelligence and the National Security Agency in support of the Worldwide Ship Tracking Program.													
This PE is a Military Intelligence Program (MIP).													
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total					
Previous President's Budget				0.437	0.527	0.519	-	0.519					
Current President's Budget				0.437	0.527	0.466	-	0.466					
Total Adjustments				0.000	0.000	-0.053	-	-0.053					
• Congressional General Reductions				-	-								
• Congressional Directed Reductions				-	-								
• Congressional Rescissions				-	-								
• Congressional Adds				-	-								
• Congressional Directed Transfers				-	-								
• Reprogrammings				-	-								
• SBIR/STTR Transfer				-	-								
• Rate/Misc Adjustments				0.000	0.000	-0.053	-	-0.053					
Change Summary Explanation													
Technical: Not applicable.													
Schedule: Not applicable.													

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy											Date: February 2018			
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0304270N / Electronic Warfare Development - MIP				Project (Number/Name) 2260 / Specific Emitter ID					
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost		
2260: Specific Emitter ID	4.531	0.437	0.527	0.466	-	0.466	0.552	0.569	0.571	0.598	Continuing	Continuing		
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-				
A. Mission Description and Budget Item Justification														
This project supports systems development and collection of Specific Emitter Identification (SEI) information from National Technical Means (NTM) to track commercial ships over 200 gross registered tons world-wide. Research and development will cover improvements and enhancements to Electronic Intelligence technology. This will include improved/next generation SEI technology for miniaturization and automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals. Propagation in a multi-path signal environment will also be assessed. All work on this project will be undertaken in pursuit of goals stated by the Office of Naval Intelligence and the National Security Agency in support of the Worldwide Ship Tracking Program.														
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)														
Title: SENSOR FUSION										FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Articles:										0.135	0.145	0.130	0.000	0.130
Description: This effort supports systems development and information fusion of improved Specific Emitter Identification (SEI) technology for automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals.										-	-	-	-	-
FY 2018 Plans:														
- Continue task to fuse additional sources of data with Specific Emitter Identification (SEI) data for automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals. Work toward increasing sensor fusion, collection and reporting automation helped reduce staffing and support remote access and control capability.														
FY 2019 Base Plans:														
This subarea develops Specific Emitter Identification (SEI) technology for automation of hardware, national collection systems, signal processing and analysis, and de-interleaving of signals.														
FY 2019 OCO Plans:														
N/A														
FY 2018 to FY 2019 Increase/Decrease Statement:														
N/A														
Title: SYSTEM AUTOMATION										0.153	0.166	0.149	0.000	0.149

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy					Date: February 2018	
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304270N / <i>Electronic Warfare Development - MIP</i>	Project (Number/Name) 2260 / <i>Specific Emitter ID</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: This effort supports development of an autonomous surveillance system capable of providing emitter signal information to a central location.	Articles:	-	-	-	-	-
FY 2018 Plans: -Continue all task to develop an unmanned, autonomous, remote collection and surveillance system. -Continue task to automate fusion of other sensor information with Specific Emitter Identification (SEI) data collection.						
FY 2019 Base Plans: This subarea develops an autonomous surveillance system that provides emitter signal information to a central location.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: N/A						
Title: TECHNOLOGY REFRESH & COMMUNICATION ENHANCEMENT	Articles:	0.149	0.216	0.187	0.000	0.187
Description: This effort improves Specific Emitter Identification (SEI) system performance, real-time communication and tactical use of SEI which will be expanded with next generation SEI technology.						
FY 2018 Plans: -Continue task to incorporate other Specific Emitter Identification (SEI) algorithms into deployed processing software. -Continue task on integrating advanced SEI hardware with WinSEI software to support improved SEI system performance and capabilities for tactical and technical use, and which can be expanded with next generation SEI algorithms. -Continue task to expand collection capability to support additional radar types. -Continue task to provide software enhancements to improve SEI system performance based on mission needs and requirements, user inputs, and platform environment.						
FY 2019 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: February 2018		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0304270N / <i>Electronic Warfare Development - MIP</i>		Project (Number/Name) 2260 / <i>Specific Emitter ID</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
This subarea improves Specific Emitter Identification (SEI) system performance, real-time communication and tactical use of SEI.					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals			0.437	0.527	0.466
C. Other Program Funding Summary (\$ in Millions)			0.000	0.466	
N/A					
Remarks					
D. Acquisition Strategy Not applicable.					
E. Performance Metrics MIP Program.					

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018				
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0304270N / Electronic Warfare Development - MIP				Project (Number/Name) 2260 / Specific Emitter ID								
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
NRL	TBD	Not Specified : Not Specified	4.531	0.437	Jan 2017	0.527	Jan 2018	0.466	Jan 2019	-		0.466	Continuing	Continuing	Continuing	
			Subtotal	4.531	0.437		0.527		0.466		-		0.466	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
			Project Cost Totals	4.531	0.437		0.527		0.466		-		0.466	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy															Date: February 2018						
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)											
1319 / 4					PE 0304270N / <i>Electronic Warfare Development - MIP</i>					2260 / <i>Specific Emitter ID</i>											
		FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Proj 2260																					
Demonstration: Installation and Testing																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0304270N / <i>Electronic Warfare Development - MIP</i>	Project (Number/Name) 2260 / <i>Specific Emitter ID</i>	
Schedule Details			
Events by Sub Project	Start	End	
Proj 2260	Quarter	Year	Quarter
Demonstration: Installation and Testing	1	2019	4
			2020

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