# Department of Defense Fiscal Year (FY) 2021 Budget Estimates

February 2020



# **Space Development Agency**

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

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Space Development Agency • Budget Estimates FY 2021 • RDT&E Program

# **Table of Volumes**

Defense Advanced Research Projects Agency	Volume 1
Missile Defense Agency	Volume 2
Office of the Secretary Of Defense	Volume 3
Chemical and Biological Defense Program	Volume 4
Defense Contract Audit Agency	Volume 5
Defense Contract Management Agency	Volume 5
Defense Counterintelligence and Security Agency	Volume 5
Defense Information Systems Agency	Volume 5
Defense Logistics Agency	Volume 5
Defense Security Cooperation Agency	Volume 5
Defense Technical Information Center	Volume 5
Defense Threat Reduction Agency	Volume 5
DoD Human Resources Activity	Volume 5
Operational Test and Evaluation, Defense	
Space Development Agency	Volume 5
The Joint Staff	Volume 5

Space Development Agency • Budget Estimates FY 2021 • RDT&E Program

United States Special Operations Command	Volume 5
Washington Headquarters Services	Volume 5

Space Development Agency • Budget Estimates FY 2021 • RDT&E Program

# **Volume 5 Table of Contents**

Comptroller Exhibit R-1	Volume 5 - v
Program Element Table of Contents (by Budget Activity then Line Item Number)	Volume 5 - xvi
Program Element Table of Contents (Alphabetically by Program Element Title)	Volume 5 - xix
Exhibit R-2s	Volume 5 - 1

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# Department of Defense FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	
Research, Development, Test & Eval, DW		95,000			95,000	
Total Research, Development, Test & Evaluation		95,000			95,000	

# Department of Defense FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

FY	2021
OCO	for

	FY 2021	FY 2021 OCO for Base	Direct War and Enduring	FY 2021 Total	FY 2021 Total
Appropriation	Base	Requirements	Costs	oco	(Base + OCO)
			**********		**********
Research, Development, Test & Eval, DW	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

# Department of Defense FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

Summary Recap of Budget Activities	FY 2020 Base Enacted	Emergency	FY 2020 OCO Enacted	OCO)
Advanced Technology Development	20,000			20,000
Advanced Component Development & Prototypes	75,000			75,000
Total Research, Development, Test & Evaluation	95,000			95,000
Summary Recap of FYDP Programs				
Space	95,000			95,000
Total Research, Development, Test & Evaluation	95,000			95,000

# Department of Defense FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

FY 2021

		FY 2021	OCO for Direct War	FY 2021	FY 2021
	FY 2021	OCO for Base		Total	Total
Summary Recap of Budget Activities	Base	Requirements	Costs	oco	(Base + OCO)
Advanced Technology Development	72,422				72,422
Advanced Component Development & Prototypes	215,994				215,994
Total Research, Development, Test & Evaluation	288,416				288,416
Common Pages of TYPE Programs					
Summary Recap of FYDP Programs					
	isusia III ia				92545 - \$6551
Space	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

# Defense-Wide FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Advanced Technology Development		20,000			20,000
Advanced Component Development & Prototypes		75,000			75,000
Total Research, Development, Test & Evaluation		95,000			95,000
Summary Recap of FYDP Programs					
Space		95,000			95,000
Total Research, Development, Test & Evaluation		95,000			95,000

#### Defense-Wide FY 2021President's Budget

#### FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget

# Total Obligational Authority (Dollars in Thousands)

21 Jan 2020

FY 2021 OCO for

20		FY 2021	FY 2021 OCO for Base	Direct War and Enduring	FY 2021 Total	FY 2021 Total
Summary Recap of Budge	t Activities	Base	Requirements		oco	(Base + OCO)
*****************		*********	***********	**********		
Advanced Technology De	velopment	72,422				72,422
Advanced Component Dev	relopment & Prototypes	215,994				215,994
Total Research, D	evelopment, Test & Evaluation	288,416				288,416
Summary Recap of FYDP	3					
Space		288,416				288,416
Total Research, D	evelopment, Test & Evaluation	288,416				288,416

#### Defense-Wide FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority

(Dollars in Thousands)

Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Space Development Agency		95,000			95,000
Total Research, Development, Test & Evaluation		95,000			95,000

#### Defense-Wide FY 2021President's Budget

# Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

21 Jan 2020

FY 2021 OCO for

Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	Direct War and Enduring Costs	oco	FY 2021 Total (Base + OCO)
Space Development Agency	288,416				288,416
Total Research, Development, Test & Evaluation	288,416				288,416

# Defense-Wide FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

21 Jan 2020

Appropriation: 0400D Research, Development, Test & Eval, DW

								FY 2020	
	Program							Total Enacted	S
Line	Element			FY 2019	FY 2020	FY 2020	FY 2020	(Base+Emerg+	е
No	Number	Item	Act	(Base + OCO)	Base Enacted	Emergency	OCO Enacted	000)	С
			222						=
71	-	e Science and Technology arch and Development	03		20,000			20,000	υ
	Advanced Te	echnology Development			20,000			20,000	
121	-	e Technology Development and btyping	04		75,000			75,000	U
						********	*******	********	
	Advanced Co	omponent Development & Protot	ypes		75,000			75,000	
						*****	*******	*******	
Total	l Research, Devel	lopment, Test & Eval, DW			95,000			95,000	

#### Defense-Wide FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority

(Dollars in Thousands)

FY 2021

Appropriation: 0400D Research, Development, Test & Eval, DW

					OCO for			
Program				FY 2021	Direct War	FY 2021	FY 2021	S
Element			FY 2021	OCO for Base	and Enduring	Total	Total	е
Number	Item	Act	Base	Requirements	Costs	oco	(Base + OCO)	С
	2552	7.7.7						-
_		03	72,422				72,422	U
						******		
Advanced Te	chnology Development		72,422				72,422	
-		04	215,994				215,994	U
			******					
Advanced Component Development & Prototy		ypes	215,994				215,994	
			******		*******			
l Research, Devel	opment, Test & Eval, DW		288,416				288,416	
_	Element Number 1206310SDA Space Resea Advanced Te . 1206410SDA Space Proto Advanced Co	Element Number Item  1206310SDA Space Science and Technology Research and Development  Advanced Technology Development  1206410SDA Space Technology Development and Prototyping	Element Number Item Act 1206310SDA Space Science and Technology 03 Research and Development  Advanced Technology Development  1206410SDA Space Technology Development and 04 Prototyping  Advanced Component Development & Prototypes	Element FY 2021 Number Item Act Base  1206310SDA Space Science and Technology 03 72,422 Research and Development  Advanced Technology Development 72,422  1206410SDA Space Technology Development and 04 Prototyping  Advanced Component Development & Prototypes 215,994	Element Number Item Act Base Requirements  1206310SDA Space Science and Technology Research and Development  Advanced Technology Development 72,422  1206410SDA Space Technology Development and Prototyping  Advanced Component Development & Prototypes 215,994	Program Element Number Item Act Base FY 2021 OCO for Base and Enduring Requirements Costs  1206310SDA Space Science and Technology Research and Development  Advanced Technology Development  1206410SDA Space Technology Development and O4 Prototyping  Advanced Component Development & Prototypes  215,994	Program Element Number Item Act Base FY 2021 OCO for Base Requirements Costs OCO Direct War and Enduring Total Costs OCO Total Act Research and Development  Advanced Technology Development  Advanced Technology Development and Prototyping  Advanced Component Development & Prototypes  Advanced Component Development & Prototypes  215,994	Program Element Number Item Act Base Requirements Costs  1206310SDA Space Science and Technology Research and Development  Advanced Technology Development  1206410SDA Space Technology Development and Prototyping  Advanced Component Development & Prototypes  215,994

R-121PB: FY 2021 President's Budget (Published Version), as of January 21, 2020 at 13:34:40

# Space Development Agency FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

21 Jan 2020

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	
71	1206310SDA	Space Science and Technology Research and Development	03		20,000			20,000	U
					*****				
Ac	ivanced Tech	nnology Development			20,000			20,000	
121	1206410SDA	Space Technology Development and Prototyping	04		75,000			75,000	U
Ac	dvanced Com	ponent Development & Prototypes			75,000			75,000	
				*******	*******				
Tota	l Space Dev	elopment Agency			95,000			95,000	

# Space Development Agency FY 2021President's Budget Exhibit R-1 FY 2021 President's Budget Total Obligational Authority (Dollars in Thousands)

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FY 2021

21 Jan 2020

Appropriation: 0400D Research, Development, Test & Eval, DW

						OCO for			
	Program				FY 2021	Direct War	FY 2021	FY 2021	S
Line	Element			FY 2021	OCO for Base	and Enduring	Total	Total	е
No	Number	Item	Act	Base	Requirements	Costs	OCO	(Base + OCO)	С
-		****			*******				-
71	_	Science and Technology rch and Development	03	72,422				72,422	U
A	dvanced Technolog	y Development		72,422				72,422	
121	-	Technology Development and typing	04	215,994				215,994	U
A	dvanced Component	Development & Prototypes		215,994				215,994	
				******	******		*******		
Tota	l Space Developme	nt Agency		288,416				288,416	

Space Development Agency • Budget Estimates FY 2021 • RDT&E Program

# **Program Element Table of Contents (by Budget Activity then Line Item Number)**

## Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
71	03	1206310SDA	Space Science and Technology Research and Development	olume 5 - 1

# Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Page	Program Element Title	t Activity Program Element Number	Budget A	Line #
Volume 5 - 7	Space Technology Development and Prototyping	1206410SDA	04	121

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Space Development Agency • Budget Estimates FY 2021 • RDT&E Program

# **Program Element Table of Contents (Alphabetically by Program Element Title)**

Program Element Title	Program Element Number	Line #	BA Page
Space Science and Technology Research and Development	1206310SDA	71	03Volume 5 - 1
Space Technology Development and Prototyping	1206410SDA	121	04Volume 5 - 7



Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency

Appropriation/Budget Activity

0400: Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)

R-1 Program Element (Number/Name)

PE 1206310SDA I Space Science and Technology Research and Development

Date: February 2020

· · · · · · · · · · · · · · · · · · ·												
COST (\$ in Millions)	Prior			FY 2021	FY 2021	FY 2021					Cost To	Total
σσοι (ψ iii wiiiiolis)	Years	FY 2019	FY 2020	Base	oco	Total	FY 2022	FY 2023	FY 2024	FY 2025	Complete	Cost
Total Program Element	0.000	0.000	20.000	72.422	-	72.422	187.638	452.790	677.290	517.290	Continuing	Continuing
032: Proliferated Low Earth Orbit (pLEO) Sensor Technology	0.000	0.000	20.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
12: Space Development Agency R&E	0.000	0.000	0.000	72.422	0.000	72.422	187.638	452.790	677.290	517.290	Continuing	Continuing

#### A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and fielding next generation space capabilities enabled by proliferation and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department space needs, including low-latency tactical communication, beyond line of sight targeting, and advanced missile tracking. Specifically, the SDA will demonstrate and field persistent, resilient capabilities needed to be responsive to emerging multi-domain threats against the U.S. national interest. The SDA will be responsible for overall programmatic policy development and execution for next-generation military space capabilities, except those funded in the Military Intelligence Program (MIP). In coordination with other DoD Space stakeholders, the SDA will drive the development of space capabilities to achieve the DoD space vision and reduce overlap and inefficiency. The SDA will expand the Department's space warfighting capability and foster growth in the U.S. space industrial base, the SDA will incorporate enhanced government-commercial relationships and international collaboration with key allies and partners.

While SDA is not responsible for building and fielding all layers of the National Defense Space Architecture, it is responsible for ensuring capability deliveries. In this construct, SDA is responsible for building and fielding the Transport layer, a proliferated constellation of satellites to provide low latency, high volume data to the warfighter. This transport layer will be compatible with the architecture defined by Fully Networked Command, Control, and Communications Network.

The establishment of a proliferated data transport layer is essential to developing a new and responsive space architecture. The SDA will develop additional subconstellations on this transport layer to provide additional capabilities, such as advanced missile warning, custody and alternative position, navigation and timing (PNT).

This program element funds efforts to develop and demonstrate a prototype proliferated communications and data transport layer and other capability layers in support of the National Defense Strategy.

UNCLASSIFIED
Page 1 of 6

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency

Date: February 2020

Appropriation/Budget Activity

0400: Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)

R-1 Program Element (Number/Name)

PE 1206310SDA / Space Science and Technology Research and Development

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	20.000	0.000	-	0.000
Current President's Budget	0.000	20.000	72.422	-	72.422
Total Adjustments	0.000	0.000	72.422	-	72.422
<ul> <li>Congressional General Reductions</li> </ul>	-	-			
<ul> <li>Congressional Directed Reductions</li> </ul>	-	-			
<ul> <li>Congressional Rescissions</li> </ul>	-	-			
<ul> <li>Congressional Adds</li> </ul>	-	-			
<ul> <li>Congressional Directed Transfers</li> </ul>	-	-			
<ul> <li>Reprogrammings</li> </ul>	-	-			
SBIR/STTR Transfer	-	-			
• Other	0.000	0.000	72.422	-	72.422

# **Change Summary Explanation**

The increase in FY 2021 is to support technology demonstrations.

UNCLASSIFIED
Page 2 of 6

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency										Date: February 2020			
0400 / 3 PE 120631						PE 1206310SDA / Space Science and 032			032 I Prolit	Project (Number/Name) 032 I Proliferated Low Earth Orbit (pLEO) Sensor Technology			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost	
032: Proliferated Low Earth Orbit (pLEO) Sensor Technology	0.000	0.000	20.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing	

#### A. Mission Description and Budget Item Justification

B Accomplishments/Planned Programs (\$ in Millions)

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and other capability layers to provide the eight capabilities outlined in the DoD Space Vision. The SDA will rapidly develop and field the next generation space architecture that will enable the US to deploy space capabilities that out-pace adversarial threats. This architecture is underpinned by a data transport layer, which will reside on a proliferated small satellite constellation in Low Earth Orbit (LEO). The Transport Layer will support the transfer of data between the space segment of the next generation space architecture, to include payloads co-hosted with the Transport Layer or other non-collocated space elements, and the ground, to include ground support infrastructure and very large numbers of users/subscribers. The Transport Layer will provide the "connective tissue" for the next generation space architecture.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	Base	OCO	Total
Title: Proliferated Low Earth Orbit (pLEO) Sensor Technology	-	20.000	0.000	0.000	0.000
Description: Develop and demonstrate a resilient and unified military data transport layer, enabled by a proliferated Low Earth Orbit (pLEO) architecture. This effort will demonstrate capability to provide very low latency (low or high bandwidth) data between any two points on the globe to enable mission-agnostic battle management, command, control, and communications (BMC3). This effort will leverage technologies developed under the DARPA Blackjack program and, wherever feasible, leverage commercial industry approaches to provide broadband internet access from space to form the foundation of the transport layer architecture.  FY 2020 Plans:  - Conduct trade studies and feasibility assessments of different sensor modalities to perform national security					
space missions Conduct Preliminary Design Review (PDR) of selected sensor payload(s).					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

R-1 Line #71

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Ag	Date: February 2020	
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 1206310SDA / Space Science and Technology Research and Development	Project (Number/Name) 032 / Proliferated Low Earth Orbit (pLEO) Sensor Technology

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
There was no planned funding in FY 2021.					
Accomplishments/Planned Programs Subtotals	-	20.000	0.000	0.000	0.000

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

N/A

### Remarks

### D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency, DARPA, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency										Date: February 2020		
Appropriation/Budget Activity 0400 / 3  R-1 Program Element (Number/Name) PE 1206310SDA / Space Science and Technology Research and Development						and	Project (Number/Name) 12 / Space Development Agency R&E					
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
12: Space Development Agency R&E	0.000	0.000	0.000	72.422	0.000	72.422	187.638	452.790	677.290	517.290	Continuing	Continuing

#### A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and fielding next generation space capabilities enabled by proliferation and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department space needs, including low-latency tactical communication, beyond line of sight targeting, and advanced missile tracking. SDA will orchestrate the rapid development and fielding of the National Defense Space Architecture (NDSA), a resilient military sensing and data transport capability via a proliferated space architecture in low-earth orbit.

This program element funds the research and development activity to deliver capabilities to US joint warfighting forces in two-year tranches, beginning as early as FY22, including performing trade studies, technical analyses, or modeling and simulation; identifying and maturing enabling technologies; defining and conducting risk reduction demonstrations, prototyping hardware or software systems; and exploring novel concept for future warfighting capabilities.

B. Accomplishments/Planned Programs (\$ in Millions)			FY 2021	FY 2021	FY 2021
	FY 2019	FY 2020	Base	oco	Total
Title: Space Technology Development Agency R&D	0.000	0.000	72.422	0.000	72.422
<b>Description:</b> Research and development activities to support development and fielding of a resilient military sensing and data transport capability via a proliferated space architecture in LEO					
<b>FY 2020 Plans:</b> N/A					
FY 2021 Base Plans: - Design, develop, and demonstrate space-to-space optical crosslink data exchange in LEO - Design and begin development of wide field-of-view payload for advanced missile tracking experiment - Conduct requirements review for multi-INT data fusion algorithms					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: The increase in FY 2021 is to support technology demonstrations.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	72.422	0.000	72.422

UNCLASSIFIED
Page 5 of 6

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Space De	Date: February 2020	
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 1206310SDA I Space Science and Technology Research and Development	Project (Number/Name) 12 / Space Development Agency R&E
C. Other Program Funding Summary (\$ in Millions) N/A		,
Remarks		
N/A		
D. Acquisition Strategy Partners for these activities may include DoD research centers, s and Development Centers, University Affiliated Research Center		pace providers, Federally Funded Research

PE 1206310SDA: Space Science and Technology Research an... Space Development Agency

UNCLASSIFIED
Page 6 of 6

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency

Appropriation/Budget Activity

R-1 Program Element (Number/Name)

0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)

PE 1206410SDA / Space Technology Development and Prototyping

Date: February 2020

COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	75.000	215.994	0.000	215.994	681.898	834.891	1,465.559	1,465.342	Continuing	Continuing
033: Transport Layer Architecture and Standards	0.000	0.000	15.000	14.891	-	14.891	14.962	14.959	15.037	15.343	Continuing	Continuing
034: Space Situational Awareness and Launch	0.000	0.000	10.000	24.740	-	24.740	49.771	49.751	49.985	51.003	Continuing	Continuing
039: Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration	0.000	0.000	30.000	39.709	-	39.709	39.899	49.864	75.185	76.716	Continuing	Continuing
191: Space-Based Interceptors	0.000	0.000	15.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
193: Space-Based Discrimination	0.000	0.000	5.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
196: Space Technology Development	-	0.000	0.000	136.654	-	136.654	577.266	720.317	1,325.352	1,322.280	Continuing	Continuing

### A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is established to develop the next generation space architecture to enable U.S. military operations to be responsive to emerging multi-domain threats against our national security. To achieve that goal, the SDA will help inform the Department's decision to develop and implement a proliferated architecture enabled by lower-cost, mass-produced spacecraft and routine space access, shift the Department to a development organization focused on experimentation, prototyping, and accelerated fielding, and change the Department to a concentrated, decoupled structure to generate speed. The SDA will manage, direct, and execute the development of the space capabilities in accordance with DoD's Space Vision and field space capabilities at speed and scale, with the following goals:

- bold breakthroughs designed to out-pace our competitors,
- technology maturation and systems engineering,
- lean engineering, manufacturing, and support,
- industrial base expansion; streamlined development and acquisition process, and
- increased acquisition cooperation with the National Reconnaissance Office (NRO).

The SDA will rapidly deploy critical elements of the next-generation space capabilities, initially focusing on these essential capabilities:

• Persistent global surveillance for advanced missile targeting,

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Space Development Agency

#### Appropriation/Budget Activity

R-1 Program Element (Number/Name)

0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)

PE 1206410SDA I Space Technology Development and Prototyping

Date: February 2020

- · Indications, warnings, targeting, and tracking for defense against advanced missile threats,
- Alternate position, navigation, and timing (PNT) for a GPS-denied environment,
- Global and near-real time space situational awareness,
- Development of a deterrent capability
- Responsive, resilient, common ground-based space support infrastructure (e.g., ground stations and launch capability),
- Cross-domain, networked, node-independent battle management command, control, and communications (BMC3), and
- Highly-scaled, low-latency, persistent, artificial intelligence-enable global surveillance.

The establishment of a data transport layer in Low Earth Orbit (LEO) is essential to developing a new, responsive space architecture, and will be SDA's primary initial focus. The SDA will develop an initial wedge of sub-constellations on this transport layer to provide additional capabilities, such as advanced missile warning.

This program element funds efforts to develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its subconstellations in support of the DoD Space Vision.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	85.000	80.000	0.000	80.000
Current President's Budget	0.000	75.000	215.994	0.000	215.994
Total Adjustments	0.000	-10.000	135.994	0.000	135.994
<ul> <li>Congressional General Reductions</li> </ul>	-	-			
<ul> <li>Congressional Directed Reductions</li> </ul>	-	-10.000			
<ul> <li>Congressional Rescissions</li> </ul>	-	-			
Congressional Adds	-	-			
<ul> <li>Congressional Directed Transfers</li> </ul>	-	-			
Reprogrammings	-	-			
SBIR/STTR Transfer	-	-			
<ul> <li>Space Technology Development</li> </ul>	0.000	0.000	136.654	0.000	136.654
Economic Adjustment	0.000	0.000	-0.078	-	-0.078
<ul> <li>Fiscal Guidance Program Adjustment</li> </ul>	-	-	-0.582	-	-0.582

# **Change Summary Explanation**

Funding was added to SDA program line to develop system designs, perform on-orbit risk reduction demonstrations, and deliver National Defense Strategy Architecture capability. This activity will result in on-orbit implementation of the NDSA.

UNCLASSIFIED
Page 2 of 32

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency										Date: February 2020		
0400 / 4 PE 1206410SDA / Space Technology 033 / Trail						Number/Name) nsport Layer Architecture and s						
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
033: Transport Layer Architecture and Standards	0.000	0.000	15.000	14.891	-	14.891	14.962	14.959	15.037	15.343	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

### A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. The SDA will rapidly develop and field the next generation space architecture that will enable the US to deploy space capabilities that out-pace adversarial threats. This architecture is underpinned by a common satellite buses, common interfaces between payloads to the bus, and common data interfaces and standards. The SDA will develop these standards for high power and lower power buses. SDA will develop standard interfaces across these two classes of satellite buses. SDA, in collaboration with other Space Stakeholders, will develop communication standards, and a ground architecture including user equipment that supports satellites utilizing these standardized products.

B. Accomplishments/Planned Programs (\$ in Millions)			FY 2021	FY 2021	FY 2021
	FY 2019	FY 2020	Base	oco	Total
Title: Transport Layer Architecture and Standards	0.000	15.000	14.891	0.000	14.891
<b>Description:</b> Develop and demonstrate prototypes that enable a resilient and unified military data transport layer and sensor capabilities, enabling a proliferated Low Earth Orbit (pLEO) architecture. This effort will define and deliver the architectures and standards necessary to rapidly prototype and field new satellite capabilities at LEO.					
FY 2020 Plans: - Develop interface and messaging standards for data transport layer architecture and bus interfaces.					
FY 2021 Base Plans: - Perform technology demonstration to test and demonstrate interface and messaging technologies.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Slight reduction in funding due to "unsubstantiated growth".					
Accomplishments/Planned Programs Subtotals	0.000	15.000	14.891	0.000	14.891

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

N/A

PE 1206410SDA: Space Technology Development and Prototy... Space Development Agency

UNCLASSIFIED

Page 3 of 32

R-1 Line #121

Volume 5 - 9

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development A	Date: February 2020	
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping	Project (Number/Name) 033 / Transport Layer Architecture and Standards
C. Other Program Funding Summary (\$ in Millions)		
<u>Remarks</u>		
N/A		
D. Acquisition Strategy  Destroys for those activities may include the Missile Defence Agency, DeD rec	acarah contora amali buginagga Jarga dafana	a contractora commercial ances providera
Partners for these activities may include the Missile Defense Agency, DoD res Federally Funded Research and Development Centers, and University Affiliate		e contractors, commercial space providers,

PE 1206410SDA: Space Technology Development and Prototy... Space Development Agency

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	021 Spac	ce Develo	pment A	gency						Date:	February	2020	
Appropriation/Budget Activity 0400 / 4						PE 1206	6410SDA	ement (No Al Space d Prototyp	Technolo	_	•	•	nitecture a	nd	
Product Development (\$ in Millions)			FY 2019		FY 2020		FY 2021 Base		FY 2		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	C/TBD	TBD : TBD	0.000	0.000		15.000		14.891		0.000		14.891	Continuing	Continuing	Continuin
טטו												44004	O	0	N1//
100		Subtotal	0.000	0.000		15.000		14.891		0.000		14.891	Continuing	Continuing	N/A
Management Service	es (\$ in M		0.000	0.000 FY 2	:019	15.000 FY 2	020	14.891 FY 2 Ba	-	0.000 FY 2		14.891 FY 2021 Total	Continuing	Continuing	N/F
	es (\$ in M  Contract Method & Type		0.000 Prior Years		2019 Award Date		020 Award Date	FY 2	-	FY 2		FY 2021	Cost To Complete	Total	Target Value of
Management Servic	Contract Method	illions)  Performing	Prior	FY 2	Award	FY 2	Award	FY 2 Ba	se Award	FY 2	CO Award	FY 2021 Total	Cost To	Total	Target Value of Contract
Management Servic	Contract Method & Type	illions)  Performing Activity & Location	Prior Years	FY 2	Award	FY 2	Award	FY 2 Bas Cost	se Award	FY 2 OC Cost	CO Award	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Servic	Contract Method & Type	Performing Activity & Location TBD : TBD	Prior Years 0.000	FY 2  Cost  0.000	Award Date	FY 2  Cost  0.000	Award Date	FY 2 Ba	Award Date	FY 2 OC Cost 0.000	Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost Continuing Continuing	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Space Development Agency											Date: February 2020																	
Appropriation/Budget Activity 0400 / 4						R-1 PE Dev	120	6410	SDA		pac	ce T	echn			)	033	•	ràns		<b>ber/l</b> rt Lay		,	itect	ure a	and		
		FY	201	9		FY	202	20		0 FY 20		021		FY 2022		2	F		Y 2023			FY 2024		4	$\top$	FY 2025		5
	1	2	3	4	. 1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	2 3	4	1	2	3	4
Transport Layer Architecture and Standards																												
Develop interface and messaging standards for data transport layer architecture																												

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency		Date: February 2020	
0400 / 4 PE	E 1206410SDA / Space Technology	• `	umber/Name) sport Layer Architecture and

# Schedule Details

	St	art	Eı	nd
Events by Sub Project	Quarter	Year	Quarter	Year
Transport Layer Architecture and Standards				
Develop interface and messaging standards for data transport layer architecture.	2	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency													
Appropriation/Budget Activity 0400 / 4					PE 120641	am Elemen 10SDA / Spa ent and Prot	ace Technol		Number/Name) ce Situational Awareness and				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost	
034: Space Situational Awareness and Launch	0.000	0.000	10.000	24.740	-	24.740	49.771	49.751	49.985	51.003	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

### A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. The Space Situational Awareness (SSA) and Launch project will further support this vision of enhanced resilience. Global and near real-time SSA will provide a detailed understanding of the space order of battle and a responsive launch capability needed to enable rapid constitution or replenishment of space capabilities.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space Situational Awareness and Launch	0.000	10.000	24.740	0.000	24.740
<b>Description:</b> Working with commercial providers, develop and demonstrate enhanced space situational awareness (SSA) and small-to-medium launch service access. This effort will leverage existing Government and commercial tools and approaches to extend capabilities for a pLEO environment. In addition, this effort will identify and contract for launch of small-to-medium size payloads, to demonstrate responsive constitution and replenishment.					
<ul> <li>FY 2020 Plans:</li> <li>Conduct trade studies of existing SSA capabilities and approaches for pLEO applications.</li> <li>Conduct trade studies of small-to-medium payload launch service providers and ability to responsively support pLEO constitution and replenishment.</li> </ul>					
FY 2021 Base Plans: - Identify launch opportunities for Space Transport Layer demonstration					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Initial assessment is expected to feed into our planning technology demonstrations.					
Accomplishments/Planned Programs Subtotals	0.000	10.000	24.740	0.000	24.740

UNCLASSIFIED
Page 8 of 32

Exhibit R-2A, RDT&E Project Justification: PB 2021 S	Space Development Agency	Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping	Project (Number/Name) 034 / Space Situational Awareness and Launch
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
N/A		
D. Acquisition Strategy Partners for these activities may include Space and Miss providers, Federally Funded Research and Developmen	ssile Systems Center, DoD research centers, small businesses, larger nt Centers, and University Affiliated Research Centers.	ge defense contractors, commercial space

PE 1206410SDA: Space Technology Development and Prototy... Space Development Agency

Exhibit R-3, RDT&E	Project Co	ost Analysis: PB 2	2021 Spac	ce Develo	pment A	gency						Date:	February	2020	
<b>Appropriation/Budg</b> 0400 / 4	et Activity	,				PE 120	6410SDA	ement (No Al Space d Prototyp	Technolo		_		r/ <b>Name)</b> ational Aw	/areness a	and
Product Developme	nt (\$ in Mi	llions)		FY 2	2019	FY 2	2020	FY 2 Bas	-	FY 2	2021 CO	FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
	C/TDD	TBD : TBD	0.000	0.000		10.000		24.740		0.000		24.740	Continuing	Continuing	Continuin
TBD	C/TBD	100.100													
TBD	C/TBD	Subtotal	0.000	0.000		10.000		24.740		0.000		24.740	Continuing	Continuing	N/A
Management Servic		Subtotal		0.000 FY 2	2019	10.000 FY 2	2020	24.740 FY 2 Ba	-	FY 2	2021 CO	24.740 FY 2021 Total	Continuing	Continuing	N/A
		Subtotal			2019 Award Date		2020 Award Date	FY 2	-	FY 2		FY 2021	Cost To Complete	Total	Target Value of
Management Servic	es (\$ in M Contract Method	Subtotal illions) Performing	0.000	FY 2	Award	FY 2	Award	FY 2 Bas	se Award	FY 2	CO Award	FY 2021 Total	Cost To	Total	Target Value of Contract
Management Servic	es (\$ in M  Contract  Method  & Type	Subtotal  illions)  Performing Activity & Location	0.000 Prior	FY 2	Award	FY 2	Award	FY 2 Bas Cost	se Award	FY 2	CO Award	FY 2021 Total Cost	Cost To	Total Cost Continuing	Target Value of Contract
Management Servic	es (\$ in M  Contract  Method  & Type	Subtotal  illions)  Performing Activity & Location  TBD : TBD	O.000  Prior Years 0.000	FY 2  Cost  0.000	Award Date	FY 2  Cost  0.000	Award Date	FY 2 Ba	Award Date	FY 2	Award Date	FY 2021 Total Cost	Cost To Complete Continuing	Total Cost Continuing	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021	Spac	ce [	Devel	opm	ent	Age	ncy															Dat	e: F	ebru	ary	2020		
Appropriation/Budget Activity 400 / 4								PE	120	64	ram E 10SD nent a	A / S	Spa	ice T	echr			)	03	-	pac		oer/N ituatio		•	arene	ess	ano
		F	Y 201	9		FY	202	0		F	Y 202	<u>!</u> 1		FY	202	2		FY	202	3		FY	2024	4		FY 2	2025	 5
	1	1	2 3	4	1	2	3	4	1		2 3	4	1	l 2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Space Situational Awareness and Launch			'		'						'	,	,				'											
Conduct trade studies of existing space situational awareness capabilities and approaches																												
Conduct trade studies of small-to-medium size payload																												

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agend	су		Date: February 2020
Appropriation/Budget Activity 0400 / 4	,	, ,	umber/Name) e Situational Awareness and

	St	art	End				
Events by Sub Project	Quarter	Year	Quarter	Year			
Space Situational Awareness and Launch							
Conduct trade studies of existing space situational awareness capabilities and approaches	2	2020	4	2021			
Conduct trade studies of small-to-medium size payload	3	2020	4	2021			

Exhibit R-2A, RDT&E Project Ju	stification:	PB 2021 S	Space Devel	opment Ag		Date: Febr	uary 2020					
Appropriation/Budget Activity 0400 / 4					PE 120641	am Element OSDA / Spa ent and Prot	ace Technol	ne) Earth Orbit nd Integratio				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
039: Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration	0.000	0.000	30.000	39.709	-	39.709	39.899	49.864	75.185	76.716	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

### A. Mission Description and Budget Item Justification

The pLEO Payload and Ground Integration project will enable a persistent global surveillance capability, enabled by a pLEO data communications transport layer, that will provide indications, warnings, targeting, and tracking to support the defeat of advanced missile threats.

B. Accomplishments/Planned Programs (\$ in Millions)			FY 2021	FY 2021	FY 2021
	FY 2019	FY 2020	Base	oco	Total
Title: pLEO Missile Warning Ground Integration	0.000	30.000	39.709	0.000	39.709
<b>Description:</b> Develop and demonstrate payload prototypes compatible with a proliferated Low Earth Orbit (pLEO) architecture. This effort will focus on developing and demonstrating sensors for beyond line of sight targeting, space-to-space data links, space-to-tactical data links, and advanced missile warning capabilities. On-orbit demonstrations will be tied to existing mission specific ground infrastructure, when it exists. Ground infrastructure will be linked or developed to support payload integration and data processing.					
FY 2020 Plans: - Develop advanced missile warning sensor and develop ground architecture to support					
FY 2021 Base Plans: - Integrate, test, and launch advanced missile warning phenomenology experiment					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: The increase in FY 2021 is to support technology demonstrations.					
Accomplishments/Planned Programs Subtotals	0.000	30.000	39.709	0.000	39.709

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

N/A

**UNCLASSIFIED** PE 1206410SDA: Space Technology Development and Prototy... Page 13 of 32

R-1 Line #121

Exhibit R-2A, RDT&E Project Justification: PB 2021 S	Space Development Agency	Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping	Project (Number/Name) 039 I Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration
C. Other Program Funding Summary (\$ in Millions)		
Remarks N/A		
D. Acquisition Strategy		
Partners for these activities may include Missile Defense Federally Funded Research and Development Centers,	e Agency, DoD research centers, small businesses, large defense	contractors, commercial space providers,
redefaily Funded Research and Development Centers,	and Oniversity Anniated Research Centers.	

PE 1206410SDA: *Space Technology Development and Prototy...* Space Development Agency

UNCLASSIFIED
Page 14 of 32

R-1 Line #121 Volume 5 - 20

Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	2021 Spac	ce Develo	pment A	gency					-	Date:	February	2020	
Appropriation/Budg 0400 / 4	et Activity	1				PE 120	6410SDA	ement (No Al Space d Prototyp	Technolo	•	039 <i>I Pi</i>	(Number roliferated Warning (	Low Ear	th Orbit (p ntegration	,
Product Developme	ent (\$ in M	illions)		FY 2	:019	FY 2	2020	FY 2 Ba		FY 2	2021 CO	FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
TBD	C/TBD	TBD : TBD	0.000	0.000		30.000		39.709		0.000		39.709	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		30.000		39.709		0.000		39.709	Continuing	Continuing	N/A
Management Servic	es (\$ in M	illions)		FY 2	019	FY 2	2020	FY 2 Bas		FY 2	2021 CO	FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
TBD	C/Various	TBD : TBD	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	N/A
			Prior			FY 2	1020	FY 2		FY 2	2021 CO	FY 2021 Total	Cost To	Total Cost	Target Value of Contract
			Years	FY 2	019	F1 4	1020	Da	36	, O	50	IUlai	Complete	COSL	Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021	Spac	e De	evelo	pme	ent	Ager	псу															Dat	te: Fe	ebru	ıary	202	0	
Appropriation/Budget Activity 0400 / 4								PΕ	1206	6410	m El DSDA nt an	4 <i>1</i> S	Spac	e Te	echn			)	03	9 <i>1 F</i>	rolit	ferat	er/Ned Lo	ow E	Eart		٠,,	
		FY	2019	)		FY	2020	)		FY	2021	1		FY	202	2		FY	202	3		FY	2024	1		FY	202	5
	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
Missile Warning Technology																												
Examine current MW ground segment and conduct trade studies of alternative																												
Conduct Preliminary Design Review of MW ground infrastructure																												

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agen	су		Date: February 2020
Appropriation/Budget Activity 0400 / 4	,	039 I Prolif	umber/Name) ferated Low Earth Orbit (pLEO) ferning Ground Integration

	St	art	Eı	nd
Events by Sub Project	Quarter	Year	Quarter	Year
Missile Warning Technology				
Examine current MW ground segment and conduct trade studies of alternative	2	2020	4	2021
Conduct Preliminary Design Review of MW ground infrastructure	2	2020	4	2021

Exhibit R-2A, RDT&E Project Ju		Date: February 2020										
Appropriation/Budget Activity 0400 / 4									Project (Number/Name) 191 / Space-Based Interceptors			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
191: Space-Based Interceptors	0.000	0.000	15.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	_	-	-	-	-		

### A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort is focused on developing the battle management software, infrastructure, and test capabilities to ensure maximum utility of pLEO hardware. This effort supports on-board space data processing, data ingest and fusion of legacy, current, and future space-based capabilities.

B. Accomplishments/Planned Programs (\$ in Millions)			FY 2021	FY 2021	FY 2021
	FY 2019	FY 2020	Base	oco	Total
Title: Space-Based Interceptor Assessment	-	15.000	0.000	0.000	0.000
<b>Description:</b> The SDA will develop software to support Battle Management Command, Control, and Communications that optimizes use of fielded space, ground, and user hardware, minimizes required communication bandwidths, and supports tactical users.					
FY 2020 Plans: The initial capabilities of the hardware architecture will be designed and specified to support a space-based operating system. Development of a ground based Hardware In The Loop laboratory for validation and verification will commence.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: This effort is not funded in FY 2021.					
Accomplishments/Planned Programs Subtotals	_	15.000	0.000	0.000	0.000

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

N/A

R-1 Line #121

Exhibit R-2A, RDT&E Project Justification: PB 2021 Spa	ace Development Agency	Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping	Project (Number/Name) 191 / Space-Based Interceptors
C. Other Program Funding Summary (\$ in Millions)		
<u>Remarks</u>		
D. Acquisition Strategy		
	nters, Federally Funded Research and Development Centers, ar	nd University Affiliated Research Centers.
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PE 1206410SDA: *Space Technology Development and Prototy...* Space Development Agency

UNCLASSIFIED
Page 19 of 32

R-1 Line #121

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Space Development Agency  Date: February 2020									
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)							
0400 / 4	PE 1206410SDA I Space Technology	191 I Space-Based Interceptors							
	Development and Prototyping								

Support (\$ in Million	s)			FY	2019	FY 2	2020	FY 2 Ba	-	FY 2		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract
Space-Based Interceptor Assessment	TBD	TBD : TBD	-	-		15.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	-	-		15.000		0.000		0.000		0.000	Continuing	Continuing	N/A
			Dulou					EV 2		EV 3		EV 2024	Coat To	Total	Target

	Prior Years	FY	2019	FY 2	020	FY 20 Bas		FY 2021 Total	Cost To	Total Cost	Target Value of Contract
Project Cost Totals	-	-		15.000		0.000	0.000	0.000	Continuing	Continuing	N/A

**Remarks** 

Exhibit R-4, RDT&E Schedule Profile: PB 202	21 Space D	evelopm	ent /	Agen	су												[	Date:	Febr	uary	202	0	
Appropriation/Budget Activity 0400 / 4					PI	E 120	6410	)SDA	A / S	nt (No pace ptotyp	Techr		•					Number/Name) ace-Based Interceptors					
	FY	2019		FY 2	020		FY	2021		F	Y 202	2		FY 2	2023		F	FY 202	24	$\top$	FY	2025	
	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
Space-Based Interceptor						,			,	'													

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agend	Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agency							
, · · · · · · · · · · · · · · · · · · ·	,	, ,	umber/Name) e-Based Interceptors					

	St	art	End		
Events by Sub Project	Quarter	Year	Quarter	Year	
Space-Based Interceptor					
Space-Based Interceptor Assessment	3	2020	4	2021	

Exhibit R-2A, RDT&E Project Ju	Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency											
Appropriation/Budget Activity 0400 / 4							it (Number/ ace Techno totyping	lumber/Name) ce-Based Discrimination				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
193: Space-Based Discrimination	0.000	0.000	5.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

### A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort is focused on developing a government reference architecture for a space-based discrimination layer for missile defense.

B. Accomplishments/Planned Programs (\$ in Millions)			FY 2021	FY 2021	FY 2021
	FY 2019	FY 2020	Base	oco	Total
Title: Space-Based Discrimination Assessment	-	5.000	0.000	0.000	0.000
<b>Description:</b> The SDA, under the leadership of the Under Secretary of Defense for Research and Engineering and in coordination with the Missile Defense Agency, Joint Staff, Air Force, and Director, Cost Assessment and Program Evaluation, will execute a Space-Based Discrimination assessment.					
FY 2020 Plans: The Space-Based Discrimination assessment entails developing a government reference architecture for a space-based discrimination layer for missile defense. These efforts include developing an independent cost estimate and assessment of technical risks, potential countermeasures, and development timelines.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: This effort is not funded in FY 2021.					
Accomplishments/Planned Programs Subtotals	_	5.000	0.000	0.000	0.000

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

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space [	Development Agency	Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping	Project (Number/Name) 193 / Space-Based Discrimination
C. Other Program Funding Summary (\$ in Millions)		
Remarks		
D. Acquisition Strategy		
Partners for these activities may include DoD research centers	s, Federally Funded Research and Development Centers, an	d University Affiliated Research Centers.
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PE 1206410SDA: Space Technology Development and Prototy... Space Development Agency

UNCLASSIFIED
Page 24 of 32

R-1 Line #121

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Space Development	Date: February 2020		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	umber/Name)
0400 / 4	PE 1206410SDA I Space Technology	193 / Spac	ce-Based Discrimination
	Development and Prototyping		

Support (\$ in Millions	lillions)			upport (\$ in Millions)			FY 2	2019	FY 2	2020	FY 2 Ba		FY 2		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To	Total Cost	Target Value of Contract			
Space-Based Discrimination Assessment	TBD	TBD : TBD	-	-		5.000		0.000		0.000		0.000	Continuing	Continuing	0.000			
		Subtotal	-	-		5.000		0.000		0.000		0.000	Continuing	Continuing	N/A			
			Prior					EV 2	0024	EV 3	0004	EV 2021	Cost To	Total	Target			

	Prior Years	FY	2019	FY 2	020	FY 20 Base	1	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		5.000		0.000	0.000	0.000	Continuing	Continuing	N/A

Remarks

ncy			Date:	Febru	uary	2020		
PE 1206410SDA / S/	pace Technology		•		,	ninatio	on	
2020 FY 2021	FY 2022 F	Y 2023	FY 20	24		FY 2	2025	.— 5
3 4 1 2 3 4	1 2 3 4 1	2 3 4	1 2 3	3 4	1	2	3	2
	R-1 Program Eleme PE 1206410SDA I S Development and Pr  2020 FY 2021	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping  2020 FY 2021 FY 2022 F	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping  PY 2020 PY 2021 PY 2022 PY 2023	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping  PY 2020 PY 2021 PY 2022 PY 2023 PY 2020 Project (Number 193 I Space-Base 193 I S	R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping  Project (Number/Name) 193 / Space-Based Dis	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping  PY 2020 PY 2021 Project (Number/Name) 193 I Space-Based Discrime 194 I Space-Based Discrime 194 I Space-Based Discrime 195 I Space-Based Disc	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping  Project (Number/Name) 193 I Space-Based Discrimination FY 2020 FY 2021 FY 2022 FY 2023 FY 2024 FY 2	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping  Project (Number/Name) 193 I Space-Based Discrimination FY 2020 FY 2021 FY 2022 FY 2023 FY 2024 FY 2025

Space-Based Discrimination Assessment

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agence	су		Date: February 2020
1	,	, ,	umber/Name) ce-Based Discrimination

	St	art	E	nd
Events by Sub Project	Quarter	Year	Quarter	Year
Space-Based Discrimination				
Space-Based Discrimination Assessment	3	2020	4	2021

Exhibit R-2A, RDT&E Project Ju	ıstification	: PB 2021 S	Space Deve	lopment Ag	ency					Date: Febr	uary 2020	
Appropriation/Budget Activity 0400 / 4					, , , , ,				(Number/Name) pace Technology Development			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
196: Space Technology Development	-	0.000	0.000	136.654	-	136.654	577.266	720.317	1,325.352	1,322.280	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

### A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and fielding next generation space capabilities enabled by proliferation and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department space needs, including low-latency tactical communication, beyond line of sight targeting, and advanced missile tracking. SDA will orchestrate the rapid development and fielding of the National Defense Space Architecture (NDSA), a resilient military sensing and data transport capability via a proliferated space architecture in low-earth orbit.

This program element funds the space technology development and prototyping activity to deliver a resilient military sensing and data transport capability via a proliferated space architecture to US joint warfighting forces in two-year tranches, beginning as early as FY22. These capabilities including a low-latency mesh network data transport layer; advanced missile tracking layer; global surveillance and surface moving target custody layer; low-latency sensor tasking, command and control, and data dissemination layer; alternate position, navigation, and timing layer; enhanced space situational awareness and deterrence layer; and common ground segment and launch services layer.

B. Accomplishments/Planned Programs (\$ in Millions)			FY 2021	FY 2021	FY 2021
	FY 2019	FY 2020	Base	oco	Total
Title: Space Technology Development	0.000	0.000	136.654	0.000	136.654
<b>Description:</b> Space technology development and prototyping of a resilient military sensing and data transport capability via a proliferated space architecture in LEO.					
<b>FY 2020 Plans:</b> N/A					
FY 2021 Base Plans:  - Design and begin development of Transport Layer Tranche 0 capability  - Design and begin development of wide field-of-view infrared payload with sensitivity sufficient to detect advance missile threats  - Design and begin development of software to perform multi-INT data fusion for targeting support  - Design, develop, and test hardware-in-the-loop facility to support architecture interoperability testing and validation					
FY 2021 OCO Plans:					

UNCLASSIFIED
Page 28 of 32

Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Ag	Exhibit R-2A, RDT&E Project Justification: PB 2021 Space Development Agency						
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping	, ,	umber/Name) re Technology Development				

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					
The increase in FY 2021 is to support technology development.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	136.654	0.000	136.654

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

N/A

#### Remarks

### D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency, Space and Missile Systems Center, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, University Affiliated Research Centers, and the Missile Defense Agency.

UNCLASSIFIED
Page 29 of 32

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Space Development Agency  Date: February 2020  Appropriation (Budget Activity)  Date: February 2020					
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)			
0400 / 4	PE 1206410SDA / Space Technology	196 I Space Technology Development			
	Development and Prototyping				

Product Development (\$ in Millions)			FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Technology Development	C/TBD	TBD : TBD	-	-		-		136.654		0.000		136.654	Continuing	Continuing	N/A
		Subtotal	-	-		-		136.654		0.000		136.654	Continuing	Continuing	N/A
			Prior Years	FY	2019	FY 2	2020	FY 2 Ba		FY 2		FY 2021 Total	Cost To	Total Cost	Target Value of Contract

0.000

136.654

Remarks

**Project Cost Totals** 

0.000

136.654 Continuing Continuing

N/A

xhibit R-4, RDT&E Schedule Profile: PB 2021 S	Spac	e D	evelo	pme	ent /	Ager	су															D	ate: F	eb	rua	ary	202	0	
opropriation/Budget Activity 400 / 4																		Project (Number/Name) 196 / Space Technology Development											
	FY 2019 FY 20			2020	20 FY 2021					FY 2022				FY	202	2023			FY 2024			FY 20			25				
	1	2	3	4	1	2	3	4	1	2	3	3 4		1 2	2 3	3 4	1	2	3	4	4 1	1 :	2 3	, (	4	1	2	3	4
Risk Reduction Transport Demos										'		,								,	'		'						
Design and begin development Transport Tranche 0																													
Risk Reduction Tracking Demos																													
Design and begin development of Tracking Tranche 0																													
Risk Reduction Data Fusion Demos																													_
Design and begin development of multi-INT data fusion software																													
Hardware-in-the-loop Capability Development																													
Design and begin development of hardware-in-the-loop capability																													

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Space Development Agend	Date: February 2020				
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206410SDA I Space Technology Development and Prototyping	, ,	umber/Name) e Technology Development		

	St	art	End			
Events by Sub Project	Quarter	Year	Quarter	Year		
Risk Reduction Transport Demos						
Design and begin development Transport Tranche 0	2	2020	4	2021		
Risk Reduction Tracking Demos						
Design and begin development of Tracking Tranche 0	2	2020	4	2021		
Risk Reduction Data Fusion Demos						
Design and begin development of multi-INT data fusion software	2	2020	4	2021		
Hardware-in-the-loop Capability Development			•	•		
Design and begin development of hardware-in-the-loop capability	2	2020	4	2021		