Department of Defense
Fiscal Year (FY) 2021 Budget Estimates

February 2020

Army

Justification Book of

Research, Development, Test & Evaluation, Army

RDT&E − Volume III, Budget Activity 8

Table of Contents

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY
APPROPRIATION LANGUAGE

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, $12,770,165,000.00 to remain available for obligation until September 30, 2022.

COST STATEMENT

The following Justification Books were prepared at a cost of $460,861: Aircraft (ACFT), Missiles (MSLS), Weapons & Tracked Combat Vehicles (WTCV), Ammunition (AMMO), Other Procurement Army (OPA) 1 – Tactical & Support Vehicles, Other Procurement Army (OPA) 2 – Communications & Electronics, Other Procurement Army (OPA) 3 & 4 - Other Support Equipment & Spares, Research, Development, Test and Evaluation (RDTE) for: Budget Activity 1, Budget Activity 2, Budget Activity 3, Budget Activity 4, Budget Activity 5A, Budget Activity 5B, Budget Activity 5C, Budget Activity 6, Budget Activity 7, and Budget Activity 8.

UNCLASSIFIED
FY 2021 RDT&E, ARMY PROGRAM ELEMENT DESCRIPTIVE SUMMARIES
Introduction and Explanation of Contents

1.   General. The purpose of this document is to provide summary information concerning the Research, Development, Test and Evaluation, Army program. The descriptive summaries are comprised of R-2 (Army RDT&E Budget Item Justification – program element level), R-2A (Army RDT&E Budget Item Justification – project level), R-3 (Army RDT&E Cost Analysis), R-4 (Schedule Profile Detail) and R-5 (Termination Liability Funding for MDAPs) Exhibits, which provide narrative information on all RDT&E program elements and projects through FY 2020.

2.   Relationship of the FY 2021 Budget Submitted to Congress to the FY 2020 Budget Submitted to Congress. This paragraph provides a list of program elements/projects that are major new starts, restructures, developmental transitions, and terminated programs. Explanations for these changes can be found in the narrative sections of the Program Element R-2A Exhibits.

New Start Programs:

Budget Activity	*OSDPE / Project*	*Project Title*
02	0602115A / EB2	HIV Biomedical Technology
02	0602134A / CD2	Counter Improvised-Threat Advanced Studies
02	0602146A / AQ2	EW Techniques Technology
02	0602146A / AQ7	High Tempo Data Driven Decision Tools Technology
03	0603002A / MP3	Phys Chem Toxicity Assessment Sys Adv Tech
03	0603115A / EB3	HIV Medical Development
03	0603134A / CD3	Counter Improvised-Threat Simulation
03	0603463A / AQ8	High Tempo Data Driven Decision Tools Adv Tech
03	0603463A / AR8	Sensing in Contested Environments Adv Tech
03	0603463A / AU2	Optimization of Geospatial Data for Visualization
03	0603463A / AV1	GEOInt/Ops Logistics Integration-Planning Adv Tech
03	0603463A / AW6	Modular GPS Independent Sensors Advanced Tech
03	0603920A / CD5	Humanitarian Demining
04	0603804A / EW8	Armored Engineer Vehicles
04	0604115A / AX3	Technology Maturation Initiatives

04	0604134A / CD4	Counter Improvised-Threat Demonstration
05	0304270A / FJ5	Terrestrial Layer System (MIP)
05	0604601A / S64	Common Remotely Operated Wpn Sys (CROWS)
05	0604604A / BX8	Cold Weather All-Terrain Vehicle (CATV)
05	0604622A / E50	TRAILER DEVELOPMENT
05	0604802A / XT2	40mm Door Breach
05	0605145A / CD6	Medical Products and Support Systems Development
06	0605801A / M23	US Army Corps of Engineers Base Operations
06	0606105A / CD7	Medical Program-Wide Activities
07	0203802A / VV2	TOW
07	0607145A / FD5	Apache Product Improvement
07	0203802A / VT9	Lethal Miniature Aerial Missile System (LMAMS)

Program Element/Project Restructures:

Budget Activity	Old OSDPE / Project: Title	New OSDPE / Project
02	0602141A / AH5: Projectile and Multi-Function Warhead Technologies	0602143A/AY6, 0602145A/BK5
02	0602143A / AN1: Narrowband SATCOM Technology	0602146A/BZ6, 060346A/AN2
02	0602143A / BE1: Support Technology to Mission Command	0602146A/AQ9
02	0602144A / BL4: Countermine Technology	0602145A/BF9
02	0602145A / BH2: C4ISR Modular Autonomy Technology	0602145A/BF9
02	0602145A / BH7: Enhanced VETRONICS Technology	0602145A/BH5
02	0602145A / BJ3: Hydrogen Based Combat System Technology	0602145A/BH5
02	0602145A / BJ7: Detection of Explosive Hazards Technology	0602145A/BF9
02	0602146A / AN3: Non Traditional Waveforms Technology	0603463A/AP6
02	0602146A / AV7: Atmospheric Modeling and Meterological Technology	0603772A/101
02	0602147A / AF5: Simulation and Aerostructures Technology	0602147A/AE7
02	0602147A / AF6: Structures Technology	0602147A/AE7
02	0602147A / AF7: Warhead Integration Technology	0602147A/AE7

02	0602147A / AF9: Precision and Accuracy Technology	0602147A/AE7
02	0602147A / AG1: Missile Electronics Technology	0602147A/AE7
02	0602147A / AG2: Information and Signal Processing Technology	0602147A/AE7
02	0602147A / AG8: Advanced Energetics Technology	0602141A/AH9
02	0602147A / AG9: Multiple Simul Engagement Technologies (MSET) Tech	0602148A/AK4
02	0602148A / AI7: Alternative Concept Engine Technology	0602148A/AM4
02	0602148A / AK1: UAS Survivability Technology	0603465A/AK3
02	0602148A / AK6: Advanced Rotorcraft Armaments Protection System Te	0603465A/AK7, 0633465A/CA8
02	0602148A / AM2: Aircraft and Aircrew Protection Technology	0602148A/AJ4
02	0602150A / AD7: Missile Fire Control Sensors Technology	0602150A/AD3
02	0602787A / 874: Cbt Casualty Care Tech	0602787A/MM4
03	0603002A / MG4: Tech Base/Enabling Res in Mil Occup Med Adv Tech	0603002A/MN7, MN9, MO3, MO8, MP3
03	0603002A / MM5: Tech Base/Enabling Res Combat Cas Care Adv Tech	0603002A/MN3, MN4, MN5, MO2, MO4, MO7
03	0603002A / MM9: Tech Base/Enabling Rsrch for Infect Dis Adv Tech	0603002A/MO9, 0602787A/MM8
03	0603002A / MN8: Drugs to Prevent and Treat Malaria Advanced Tech	0602787A/MM8
03	0603002A / MO3: Military Occupational Fitness Standards Adv Tech	0603002A/MN7
03	0603118A / AZ8: Soldier Squad Small Arms Armaments Adv Tech	0602143/AY8, 0603463A/AQ1
03	0603462A / BH3: C4ISR Modular Autonomy Advanced Technology	0603462A/BZ9
03	0603462A / BI1: Protection for Autonomous Systems Adv Tech	0603462A/BG7
03	0603462A / BJ6: Hydrogen Based Combat System Advanced Technology	0603462A/BH6
03	0603462A / BJ8: Detection of Explosive Hazards Advanced Technology	0602145A/BF9
03	0603463A / AR2: Energy Informed Operations Advanced Technology	0603465A/AM5
03	0603463A / AU6: Automated Analytics for Operational Environment AT	0602146/AT7
03	0603464A / AF4: Missile Simulation Advanced Technology	0602147/AF8
03	0603464A / AH3: Single Multi-mission Attack Missile Adv Tech	0603465A/AK5
03	0603464A / BS3: Strategic Missile Advanced Technology	0603464A/BY2
03	0603465A / AI6: Next Gen Tactical UAS TD Advanced Technology	0603465A
03	0603465A / AM3: Aircraft and Aircrew Protection Advanced Tech	0603465A/AJ5
03	0603466A / AC8: Low Cost Extended Range Air Defense Adv Tech	0603466A/AD4
04	1206120A / FJ8: Assured Positioning, Navigation and Timing (PNT)	0604120A/ED5, BV4

04	1206120A / FJ9: Dismounted A-PNT	0604120A/EH8
04	1206120A / FK2: Mounted A-PNT	0604120A/EJ2
04	1206120A / FK3: Anti-Jam Antenna	0604120A/EJ2
04	1206308A / FE5: Space And Missile Defense Integration	0603308A/990
04	0603639A / EB8: OWL for Small Caliber Ammunition	0604802A/EP4
04	0603639A / EC2: Adv Armor-Piercing (ADVAP) for Small Cal Ammo	0604802A/FL4
04	0603639A / EU3: .50 Caliber All-Purpose Tactical Cartridge (APTC)	0604802A/EU5
04	0604541A / BT1: Interoperability	0604541A/BT3, BT5
04	0604541A / BT4: Network Technology Maturation Initiatives (NTMI)	0604541A/BT5
05	0604798A / DY3: NIE Test & Evaluation	0604798A/DY7
05	0604798A / DZ6: Army Integration Management & Coordination	0605054A/FL7
06	0605326A / 33B: Soldier-Centered Analyses For Future Force	0605604A/675
07	1203142A / FE1: Dscs-Dcs (Phase II)	0303142A/253
07	1203142A / FE2: MILSATCOM System Engineering	0303142A/456
07	1203142A / FI8: Protected Anti-JAM Tactical SATCOM	0303142A/456
07	1208053A / FE7: Joint Tact Grd Station-P3I(MIP)	0208053A/635
07	0303028A / FG2: Counterintelligence & Human Intel Modernization	0607150A/BS5
07	0303028A / H13: Information Dominance Center (IDC) - Tiara	0607150A/BS5
07	0305232A / RA7: RQ-11 Raven (MIP)	0604101A/BR6, 0605205A/BR7

Program Terminations (including transfers to Procurement and Sustainment):

Budget Activity	*OSDPE / Project*	*Project Title*
02	0602146A / AN5	Protected SATCOM-WB Global SATCOM Inter Canc Tech
02	0602146A / AU5	Automated Analytics for Operational Environment
02	0602146A / AW5	Modular GPS Independent Sensors Technology
02	0602147A / AH2	Single Multi-mission Attack Missile (SMAM) Technol
02	0602213A / CY9	Decoy and Deterrence Technology
02	0602787A / VB4	System Biology And Network Science Technology
03	0603457A / 7CY	Decoy and Deterrence Advanced Technology

03	0603462A / BF5	Adv Lethality & Accuracy Sys for Med Cal Adv Tech
03	0603463A / AW2	Autonomous Navigation Advanced Technology
03	0603464A / AE6	Strategic Long Range Cannon Advanced Technology
03	0603465A / AI4	Joint Multi-Role (JMR) Demonstration Advanced Tech
03	0603465A / AL6	Degraded Vis Environ Mitigation (DVE-M) Adv Tech
04	1206120A / FK1	PSEUDOLITES
04	0603804A / G11	Adv Elec Energy Con Ad
04	0604115A / AX8	Adv Leth and Accuracy Sys for Med Calber (ALAS-MC)
04	0604644A / MR1	Mobile Intermediate Range Missile
05	0604201A / EW7	Degraded Visual Environment
05	0604601A / FI2	Lightweight 30mm Cannon
05	0604710A / L76	Dismounted Fire Support Laser Targeting Systems
05	0604802A / ED7	Advanced Multipurpose (AMP) Cartridge
05	0604802A / EU7	Enhanced Lethality Cannon Munitions
05	0604804A / FG4	Ultra-Lightweight Camouflage Net System (ULCANS)
05	0604804A / L43	ENGINEER SUPPORT EQUIPMENT - ED
05	0604827A / S65	Platoon Power Generator
05	0604852A / XU9	Active Protection System
05	0604854A / 509	LIGHTWEIGHT 155M HOWITZER
05	0605013A / 193	Medical Communications For Combat Casualty
05	0605013A / XV6	Army Leader Dashboard
05	0605029A / EQ2	IntegGrdSecSurvRespC(IGSSR-C)
05	0605034A / EQ4	Tactical Security System (TSS)
05	0605036A / EQ5	Combating Weapons of Mass Destruction (CWMD)
05	0605049A / XT4	Advanced Threat Detection System (ATDS)
05	0605053A / FB2	Man Transportable Robotic System (MTRS) Inc II
05	0605053A / FB9	MTRS Standardization
06	0605805A / 857	DoD Explosives Safety Standards
06	0606001A / FD4	Military Ground-Based CREW Technology
07	0303150A / C86	Army Global C2 System

07	0305233A / RQ7	RQ-7 Shadow UAV
07	0307665A / FL5	Next Gen Biometric Collection Capability (MIP)
07	0607138A / ES5	Fixed Wing Product Improvement Program
07	0607665A / DT2	Non-MIP Biometrics

3.   **Classification:** This document contains no classified data. Appropriately cleared individuals can obtain further information on Classified/Special Access Programs by contacting the Department of the Army.

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, Army	11,371,268	12,543,435		147,304	12,690,739
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739

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

Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Research, Development, Test & Eval, Army	12,587,343		182,824	182,824	12,770,167
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

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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)

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)
Basic Research	491,263	574,484			574,484
Applied Research	1,553,764	1,259,374			1,259,374
Advanced Technology Development	1,561,576	1,531,516			1,531,516
Advanced Component Development & Prototypes	1,213,569	2,975,681		11,114	2,986,795
System Development & Demonstration	3,119,552	2,989,779		100,147	3,089,926
Management Support	1,710,179	1,368,475		1,875	1,370,350
Operational Systems Development	1,721,365	1,844,126		34,168	1,878,294
Software and Digital Technology Pilot Programs					
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739
Summary Recap of FYDP Programs					
General Purpose Forces	646,373	765,324			765,324
Intelligence and Communications	311,699	236,563		37,368	273,931
Research and Development	10,090,836	11,139,975		109,936	11,249,911
Central Supply and Maintenance	106,766	108,348			108,348
Administration and Associated Activities	358				
Space	209,281	285,952			285,952
Classified Programs	5,955	7,273			7,273
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739

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 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Basic Research	463,359				463,359
Applied Research	920,881		2,000	2,000	922,881
Advanced Technology Development	1,203,590				1,203,590
Advanced Component Development & Prototypes	3,421,608		2,520	2,520	3,424,128
System Development & Demonstration	3,199,798		97,825	97,825	3,297,623
Management Support	1,333,123		5,137	5,137	1,338,260
Operational Systems Development	1,998,539		75,342	75,342	2,073,881
Software and Digital Technology Pilot Programs	46,445				46,445
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

Summary Recap of FYDP Programs					
General Purpose Forces	923,370		2,300	2,300	925,670
Intelligence and Communications	309,698		76,942	76,942	386,640
Research and Development	11,289,280		103,582	103,582	11,392,862
Central Supply and Maintenance	61,012				61,012
Administration and Associated Activities					
Space					
Classified Programs	3,983				3,983
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

R-121PB: FY 2021 President's Budget (Published Version), as of January 17, 2020 at 11:58:58

Department of the Army
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)
Basic Research	491,263	574,484			574,484
Applied Research	1,553,764	1,259,374			1,259,374
Advanced Technology Development	1,561,576	1,531,516			1,531,516
Advanced Component Development & Prototypes	1,213,569	2,975,681		11,114	2,986,795
System Development & Demonstration	3,119,552	2,989,779		100,147	3,089,926
Management Support	1,710,179	1,368,475		1,875	1,370,350
Operational Systems Development	1,721,365	1,844,126		34,168	1,878,294
Software and Digital Technology Pilot Programs					
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739
Summary Recap of FYDP Programs					
General Purpose Forces	646,373	765,324			765,324
Intelligence and Communications	311,699	236,563		37,368	273,931
Research and Development	10,090,836	11,139,975		109,936	11,249,911
Central Supply and Maintenance	106,766	108,348			108,348
Administration and Associated Activities	358				
Space	209,281	285,952			285,952
Classified Programs	5,955	7,273			7,273
Total Research, Development, Test & Evaluation	11,371,268	12,543,435		147,304	12,690,739

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

Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Basic Research	463,359				463,359
Applied Research	920,881		2,000	2,000	922,881
Advanced Technology Development	1,203,590				1,203,590
Advanced Component Development & Prototypes	3,421,608		2,520	2,520	3,424,128
System Development & Demonstration	3,199,798		97,825	97,825	3,297,623
Management Support	1,333,123		5,137	5,137	1,338,260
Operational Systems Development	1,998,539		75,342	75,342	2,073,881
Software and Digital Technology Pilot Programs	46,445				46,445
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

Summary Recap of FYDP Programs	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
General Purpose Forces	923,370		2,300	2,300	925,670
Intelligence and Communications	309,698		76,942	76,942	386,640
Research and Development	11,289,280		103,582	103,582	11,392,862
Central Supply and Maintenance	61,012				61,012
Administration and Associated Activities					
Space					
Classified Programs	3,983				3,983
Total Research, Development, Test & Evaluation	12,587,343		182,824	182,824	12,770,167

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

Appropriation: 2040A Research, Development, Test & Eval, Army

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)	Sec
1	0601101A	In-House Laboratory Independent Research	01	11,391					U
2	0601102A	Defense Research Sciences	01	306,347	354,480			354,480	U
3	0601103A	University Research Initiatives	01	62,813	87,858			87,858	U
4	0601104A	University and Industry Research Centers	01	110,712	127,164			127,164	U
5	0601121A	Cyber Collaborative Research Alliance	01		4,982			4,982	U
		Basic Research		491,263	574,484			574,484	
6	0602105A	Materials Technology	02	79,432					U
7	0602115A	Biomedical Technology	02						U
8	0602120A	Sensors and Electronic Survivability	02	90,023					U
9	0602122A	TRACTOR HIP	02	8,674					U
10	0602126A	TRACTOR JACK	02	400					U
11	0602134A	Counter Improvised-Threat Advanced Studies	02						U
12	0602141A	Lethality Technology	02		69,961			69,961	U
13	0602142A	Army Applied Research	02		30,819			30,819	U
14	0602143A	Soldier Lethality Technology	02		145,900			145,900	U
15	0602144A	Ground Technology	02		143,899			143,899	U
16	0602145A	Next Generation Combat Vehicle Technology	02		263,547			263,547	U
17	0602146A	Network C3I Technology	02		138,016			138,016	U

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

Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
1	0601101A	In-House Laboratory Independent Research	01						U
2	0601102A	Defense Research Sciences	01	303,257				303,257	U
3	0601103A	University Research Initiatives	01	67,148				67,148	U
4	0601104A	University and Industry Research Centers	01	87,877				87,877	U
5	0601121A	Cyber Collaborative Research Alliance	01	5,077				5,077	U
		Basic Research		463,359				463,359	
6	0602105A	Materials Technology	02						U
7	0602115A	Biomedical Technology	02	11,835				11,835	U
8	0602120A	Sensors and Electronic Survivability	02						U
9	0602122A	TRACTOR HIP	02						U
10	0602126A	TRACTOR JACK	02						U
11	0602134A	Counter Improvised-Threat Advanced Studies	02	2,000				2,000	U
12	0602141A	Lethality Technology	02	42,425				42,425	U
13	0602142A	Army Applied Research	02	30,757				30,757	U
14	0602143A	Soldier Lethality Technology	02	125,435				125,435	U
15	0602144A	Ground Technology	02	28,047				28,047	U
16	0602145A	Next Generation Combat Vehicle Technology	02	217,565		2,000	2,000	219,565	U
17	0602146A	Network C3I Technology	02	114,404				114,404	U

Department of the Army
FY 2021President's Budget
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Total Obligational Authority
(Dollars in Thousands)

Appropriation: 2040A Research, Development, Test & Eval, Army

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)	Sec
18	0602147A	Long Range Precision Fires Technology	02		120,327			120,327	U
19	0602148A	Future Verticle Lift Technology	02		98,359			98,359	U
20	0602150A	Air and Missile Defense Technology	02		95,771			95,771	U
21	0602211A	Aviation Technology	02	80,424					U
22	0602213A	C3I Applied Cyber	02		18,947			18,947	U
23	0602270A	Electronic Warfare Technology	02	25,127					U
24	0602303A	Missile Technology	02	90,496					U
25	0602307A	Advanced Weapons Technology	02	43,454					U
26	0602308A	Advanced Concepts and Simulation	02	28,623					U
27	0602601A	Combat Vehicle and Automotive Technology	02	102,899					U
28	0602618A	Ballistics Technology	02	86,737					U
29	0602622A	Chemical, Smoke and Equipment Defeating Technology	02	4,884					U
30	0602623A	Joint Service Small Arms Program	02	11,890					U
31	0602624A	Weapons and Munitions Technology	02	379,833					U
32	0602705A	Electronics and Electronic Devices	02	98,855					U
33	0602709A	Night Vision Technology	02	33,218					U
34	0602712A	Countermine Systems	02	26,594					U
35	0602716A	Human Factors Engineering Technology	02	23,755					U
36	0602720A	Environmental Quality Technology	02	15,364					U

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

Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
18	0602147A	Long Range Precision Fires Technology	02	60,553				60,553	U
19	0602148A	Future Verticle Lift Technology	02	96,484				96,484	U
20	0602150A	Air and Missile Defense Technology	02	56,298				56,298	U
21	0602211A	Aviation Technology	02						U
22	0602213A	C3I Applied Cyber	02	18,816				18,816	U
23	0602270A	Electronic Warfare Technology	02						U
24	0602303A	Missile Technology	02						U
25	0602307A	Advanced Weapons Technology	02						U
26	0602308A	Advanced Concepts and Simulation	02						U
27	0602601A	Combat Vehicle and Automotive Technology	02						U
28	0602618A	Ballistics Technology	02						U
29	0602622A	Chemical, Smoke and Equipment Defeating Technology	02						U
30	0602623A	Joint Service Small Arms Program	02						U
31	0602624A	Weapons and Munitions Technology	02						U
32	0602705A	Electronics and Electronic Devices	02						U
33	0602709A	Night Vision Technology	02						U
34	0602712A	Countermine Systems	02						U
35	0602716A	Human Factors Engineering Technology	02						U
36	0602720A	Environmental Quality Technology	02						U

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37	0602782A	Command, Control, Communications Technology	02	51,685					U
38	0602783A	Computer and Software Technology	02	14,622					U
39	0602784A	Military Engineering Technology	02	96,922					U
40	0602785A	Manpower/Personnel/Training Technology	02	17,157	20,873			20,873	U
41	0602786A	Warfighter Technology	02	55,467					U
42	0602787A	Medical Technology	02	87,229	112,955			112,955	U
		Applied Research		1,553,764	1,259,374			1,259,374	
43	0603001A	Warfighter Advanced Technology	03	40,501					U
44	0603002A	Medical Advanced Technology	03	94,575	83,030			83,030	U
45	0603003A	Aviation Advanced Technology	03	165,035					U
46	0603004A	Weapons and Munitions Advanced Technology	03	240,862					U
47	0603005A	Combat Vehicle and Automotive Advanced Technology	03	171,448					U
48	0603006A	Space Application Advanced Technology	03	48,542					U
49	0603007A	Manpower, Personnel and Training Advanced Technology	03	6,270	11,038			11,038	U
50	0603009A	TRACTOR HIKE	03	22,631					U
51	0603015A	Next Generation Training & Simulation Systems	03	27,711					U
52	0603115A	Medical Development	03						U

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37	0602782A	Command, Control, Communications Technology	02						U
38	0602783A	Computer and Software Technology	02						U
39	0602784A	Military Engineering Technology	02						U
40	0602785A	Manpower/Personnel/Training Technology	02	20,766				20,766	U
41	0602786A	Warfighter Technology	02						U
42	0602787A	Medical Technology	02	95,496				95,496	U
		Applied Research		920,881		2,000	2,000	922,881	
43	0603001A	Warfighter Advanced Technology	03						U
44	0603002A	Medical Advanced Technology	03	38,896				38,896	U
45	0603003A	Aviation Advanced Technology	03						U
46	0603004A	Weapons and Munitions Advanced Technology	03						U
47	0603005A	Combat Vehicle and Automotive Advanced Technology	03						U
48	0603006A	Space Application Advanced Technology	03						U
49	0603007A	Manpower, Personnel and Training Advanced Technology	03	11,659				11,659	U
50	0603009A	TRACTOR HIKE	03						U
51	0603015A	Next Generation Training & Simulation Systems	03						U
52	0603115A	Medical Development	03	27,723				27,723	U

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53	0603117A	Army Advanced Technology Development	03		66,338			66,338	U
54	0603118A	Soldier Lethality Advanced Technology	03		135,968			135,968	U
55	0603119A	Ground Advanced Technology	03		136,793			136,793	U
56	0603125A	Combating Terrorism - Technology Development	03	43,910					U
57	0603130A	TRACTOR NAIL	03	4,896					U
58	0603131A	TRACTOR EGGS	03	6,041					U
59	0603134A	Counter Improvised-Threat Simulation	03						U
60	0603270A	Electronic Warfare Technology	03	40,461					U
61	0603313A	Missile and Rocket Advanced Technology	03	92,404					U
62	0603322A	TRACTOR CAGE	03	16,845					U
63	0603457A	C3I Cyber Advanced Development	03		23,769			23,769	U
64	0603461A	High Performance Computing Modernization Program	03	211,457	224,755			224,755	U
65	0603462A	Next Generation Combat Vehicle Advanced Technology	03		260,535			260,535	U
66	0603463A	Network C3I Advanced Technology	03		142,899			142,899	U
67	0603464A	Long Range Precision Fires Advanced Technology	03		189,386			189,386	U
68	0603465A	Future Vertical Lift Advanced Technology	03		174,892			174,892	U

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53	0603117A	Army Advanced Technology Development	03	62,663				62,663	U
54	0603118A	Soldier Lethality Advanced Technology	03	109,608				109,608	U
55	0603119A	Ground Advanced Technology	03	14,795				14,795	U
56	0603125A	Combating Terrorism - Technology Development	03						U
57	0603130A	TRACTOR NAIL	03						U
58	0603131A	TRACTOR EGGS	03						U
59	0603134A	Counter Improvised-Threat Simulation	03	25,000				25,000	U
60	0603270A	Electronic Warfare Technology	03						U
61	0603313A	Missile and Rocket Advanced Technology	03						U
62	0603322A	TRACTOR CAGE	03						U
63	0603457A	C3I Cyber Advanced Development	03	23,357				23,357	U
64	0603461A	High Performance Computing Modernization Program	03	188,024				188,024	U
65	0603462A	Next Generation Combat Vehicle Advanced Technology	03	199,358				199,358	U
66	0603463A	Network C3I Advanced Technology	03	158,608				158,608	U
67	0603464A	Long Range Precision Fires Advanced Technology	03	121,060				121,060	U
68	0603465A	Future Vertical Lift Advanced Technology	03	156,194				156,194	U

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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)	Sec
69	0603466A	Air and Missile Defense Advanced Technology	03		82,113			82,113	U
70	0603606A	Landmine Warfare and Barrier Advanced Technology	03	16,860					U
71	0603607A	Joint Service Small Arms Program	03	22,628					U
72	0603710A	Night Vision Advanced Technology	03	69,094					U
73	0603728A	Environmental Quality Technology Demonstrations	03	28,079					U
74	0603734A	Military Engineering Advanced Technology	03	100,359					U
75	0603772A	Advanced Tactical Computer Science and Sensor Technology	03	45,799					U
76	0603794A	C3 Advanced Technology	03	45,168					U
77	0603920A	Humanitarian Demining	03						U
		Advanced Technology Development		1,561,576	1,531,516			1,531,516	
78	0603305A	Army Missle Defense Systems Integration	04	60,301	59,487			59,487	U
79	0603308A	Army Space Systems Integration	04						U
80	0603327A	Air and Missile Defense Systems Engineering	04	44,743	52,480		500	52,980	U
81	0603619A	Landmine Warfare and Barrier - Adv Dev	04	40,255	82,915			82,915	U
82	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04	19,852					U
83	0603639A	Tank and Medium Caliber Ammunition	04	40,358	77,696			77,696	U

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69	0603466A	Air and Missile Defense Advanced Technology	03	58,130				58,130	U
70	0603606A	Landmine Warfare and Barrier Advanced Technology	03						U
71	0603607A	Joint Service Small Arms Program	03						U
72	0603710A	Night Vision Advanced Technology	03						U
73	0603728A	Environmental Quality Technology Demonstrations	03						U
74	0603734A	Military Engineering Advanced Technology	03						U
75	0603772A	Advanced Tactical Computer Science and Sensor Technology	03						U
76	0603794A	C3 Advanced Technology	03						U
77	0603920A	Humanitarian Demining	03	8,515				8,515	U
		Advanced Technology Development		1,203,590				1,203,590	
78	0603305A	Army Missile Defense Systems Integration	04	11,062				11,062	U
79	0603308A	Army Space Systems Integration	04	26,230				26,230	U
80	0603327A	Air and Missile Defense Systems Engineering	04	26,482		500	500	26,982	U
81	0603619A	Landmine Warfare and Barrier - Adv Dev	04	64,092				64,092	U
82	0603627A	Smoke, Obscurant and Target Defeating Sys-Adv Dev	04						U
83	0603639A	Tank and Medium Caliber Ammunition	04	92,753				92,753	U

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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)	S e c
84	0603645A	Armored System Modernization - Adv Dev	04	80,106	144,234			144,234	U
85	0603747A	Soldier Support and Survivability	04	8,067	6,514		3,000	9,514	U
86	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	35,667	37,490			37,490	U
87	0603774A	Night Vision Systems Advanced Development	04	7,072	200,791			200,791	U
88	0603779A	Environmental Quality Technology - Dem/Val	04	14,190	19,561			19,561	U
89	0603790A	NATO Research and Development	04	3,564	5,406			5,406	U
90	0603801A	Aviation - Adv Dev	04	93,885	505,890			505,890	U
91	0603804A	Logistics and Engineer Equipment - Adv Dev	04	18,845	6,254		1,085	7,339	U
92	0603807A	Medical Systems - Adv Dev	04	38,371	36,975			36,975	U
93	0603827A	Soldier Systems - Advanced Development	04	30,384	26,113			26,113	U
94	0604017A	Robotics Development	04	70,745	84,381			84,381	U
95	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04	8,225					U
96	0604021A	Electronic Warfare Technology Maturation (MIP)	04		23,043			23,043	U
97	0604035A	Low Earth Orbit (LEO) Satellite Capability	04						U
98	0604100A	Analysis Of Alternatives	04	9,396	10,023			10,023	U

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84	0603645A	Armored System Modernization - Adv Dev	04	151,478				151,478	U
85	0603747A	Soldier Support and Survivability	04	5,841				5,841	U
86	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	194,775				194,775	U
87	0603774A	Night Vision Systems Advanced Development	04	24,316				24,316	U
88	0603779A	Environmental Quality Technology - Dem/Val	04	13,387				13,387	U
89	0603790A	NATO Research and Development	04	4,762				4,762	U
90	0603801A	Aviation - Adv Dev	04	647,937				647,937	U
91	0603804A	Logistics and Engineer Equipment - Adv Dev	04	4,761				4,761	U
92	0603807A	Medical Systems - Adv Dev	04	28,520				28,520	U
93	0603827A	Soldier Systems - Advanced Development	04	26,138				26,138	U
94	0604017A	Robotics Development	04	121,207				121,207	U
95	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04						U
96	0604021A	Electronic Warfare Technology Maturation (MIP)	04	22,840				22,840	U
97	0604035A	Low Earth Orbit (LEO) Satellite Capability	04	22,678				22,678	U
98	0604100A	Analysis Of Alternatives	04	10,082				10,082	U

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99	0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04						U
100	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	12,393	40,745			40,745	U
101	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	84,981	379,772			379,772	U
102	0604115A	Technology Maturation Initiatives	04	91,749	179,676			179,676	U
103	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	75,711	42,900			42,900	U
104	0604118A	TRACTOR BEAM	04	52,894					U
105	0604119A	Army Advanced Component Development & Prototyping	04		112,806		4,529	117,335	U
106	0604120A	Assured Positioning, Navigation and Timing (PNT)	04						U
107	0604121A	Synthetic Training Environment Refinement & Prototyping	04	39,890	103,621			103,621	U
108	0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04						U
109	0604182A	Hypersonics	04		404,000			404,000	U
110	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04	10,324					U
111	0604403A	Future Interceptor	04		2,000			2,000	U
112	0604541A	Unified Network Transport	04		29,700			29,700	U
113	0604644A	Mobile Medium Range Missile	04		5,000			5,000	U

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99	0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04	1,378				1,378	U
100	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	40,083				40,083	U
101	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	376,373				376,373	U
102	0604115A	Technology Maturation Initiatives	04	156,834				156,834	U
103	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	4,995				4,995	U
104	0604118A	TRACTOR BEAM	04						U
105	0604119A	Army Advanced Component Development & Prototyping	04	170,490				170,490	U
106	0604120A	Assured Positioning, Navigation and Timing (PNT)	04	128,125				128,125	U
107	0604121A	Synthetic Training Environment Refinement & Prototyping	04	129,547				129,547	U
108	0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04	13,831				13,831	U
109	0604182A	Hypersonics	04	801,417				801,417	U
110	0604319A	Indirect Fire Protection Capability Increment 2-Intercept (IFPC2)	04						U
111	0604403A	Future Interceptor	04	7,992				7,992	U
112	0604541A	Unified Network Transport	04	40,677				40,677	U
113	0604644A	Mobile Medium Range Missile	04						U

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114	0604785A	Integrated Base Defense (Budget Activity 4)	04				2,000	2,000	U
115	0305251A	Cyberspace Operations Forces and Force Support	04	52,817	52,102			52,102	U
116	1206120A	Assured Positioning, Navigation and Timing (PNT)	04	123,364	139,110			139,110	U
117	1206308A	Army Space Systems Integration	04	45,420	104,996			104,996	U
		Advanced Component Development & Prototypes		1,213,569	2,975,681		11,114	2,986,795	
118	0604201A	Aircraft Avionics	05	31,401	8,414			8,414	U
119	0604270A	Electronic Warfare Development	05	56,310	59,539			59,539	U
120	0604328A	TRACTOR CAGE	05	27,050					U
121	0604601A	Infantry Support Weapons	05	74,629	87,179			87,179	U
122	0604604A	Medium Tactical Vehicles	05	3,905					U
123	0604611A	JAVELIN	05	5,250	14,997			14,997	U
124	0604622A	Family of Heavy Tactical Vehicles	05	11,182	13,125			13,125	U
125	0604633A	Air Traffic Control	05	11,580	5,781			5,781	U
126	0604642A	Light Tactical Wheeled Vehicles	05	1,013	2,965			2,965	U
127	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	359,017	285,136			285,136	U
128	0604710A	Night Vision Systems - Eng Dev	05	139,337	143,696			143,696	U
129	0604713A	Combat Feeding, Clothing, and Equipment	05	4,393	7,393			7,393	U

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114	0604785A	Integrated Base Defense (Budget Activity 4)	04			2,020	2,020	2,020	U
115	0305251A	Cyberspace Operations Forces and Force Support	04	50,525				50,525	U
116	1206120A	Assured Positioning, Navigation and Timing (PNT)	04						U
117	1206308A	Army Space Systems Integration	04						U
		Advanced Component Development & Prototypes		3,421,608		2,520	2,520	3,424,128	
118	0604201A	Aircraft Avionics	05	2,764				2,764	U
119	0604270A	Electronic Warfare Development	05	62,426				62,426	U
120	0604328A	TRACTOR CAGE	05						U
121	0604601A	Infantry Support Weapons	05	91,574				91,574	U
122	0604604A	Medium Tactical Vehicles	05	8,523				8,523	U
123	0604611A	JAVELIN	05	7,493				7,493	U
124	0604622A	Family of Heavy Tactical Vehicles	05	24,792				24,792	U
125	0604633A	Air Traffic Control	05	3,511				3,511	U
126	0604642A	Light Tactical Wheeled Vehicles	05	1,976				1,976	U
127	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	135,488				135,488	U
128	0604710A	Night Vision Systems - Eng Dev	05	61,445				61,445	U
129	0604713A	Combat Feeding, Clothing, and Equipment	05	2,814				2,814	U

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130	0604715A	Non-System Training Devices - Eng Dev	05	42,604	30,912			30,912	U
131	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	208,965	33,502			33,502	U
132	0604742A	Constructive Simulation Systems Development	05	21,354	11,636			11,636	U
133	0604746A	Automatic Test Equipment Development	05	10,104	10,915			10,915	U
134	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	8,423	7,801			7,801	U
135	0604768A	Brilliant Anti-Armor Submunition (BAT)	05	6,568	20,000			20,000	U
136	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	20,514	9,241			9,241	U
137	0604798A	Brigade Analysis, Integration and Evaluation	05	48,030	38,303			38,303	U
138	0604802A	Weapons and Munitions - Eng Dev	05	173,713	186,323			186,323	U
139	0604804A	Logistics and Engineer Equipment - Eng Dev	05	70,096	107,826			107,826	U
140	0604805A	Command, Control, Communications Systems - Eng Dev	05	15,366	12,595			12,595	U
141	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	45,054	48,264			48,264	U
142	0604808A	Landmine Warfare/Barrier - Eng Dev	05	39,261	37,108			37,108	U
143	0604818A	Army Tactical Command & Control Hardware & Software	05	163,229	129,974			129,974	U
144	0604820A	Radar Development	05	37,847	95,720			95,720	U

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Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
130	0604715A	Non-System Training Devices - Eng Dev	05	28,036				28,036	U
131	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	43,651		27,000	27,000	70,651	U
132	0604742A	Constructive Simulation Systems Development	05	10,150				10,150	U
133	0604746A	Automatic Test Equipment Development	05	5,578				5,578	U
134	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	7,892				7,892	U
135	0604768A	Brilliant Anti-Armor Submunition (BAT)	05	24,975				24,975	U
136	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	3,568				3,568	U
137	0604798A	Brigade Analysis, Integration and Evaluation	05	19,268				19,268	U
138	0604802A	Weapons and Munitions - Eng Dev	05	265,811				265,811	U
139	0604804A	Logistics and Engineer Equipment - Eng Dev	05	49,694				49,694	U
140	0604805A	Command, Control, Communications Systems - Eng Dev	05	11,079				11,079	U
141	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	49,870				49,870	U
142	0604808A	Landmine Warfare/Barrier - Eng Dev	05	9,589				9,589	U
143	0604818A	Army Tactical Command & Control Hardware & Software	05	162,513				162,513	U
144	0604820A	Radar Development	05	109,259				109,259	U

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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)	S e c I
145	0604822A	General Fund Enterprise Business System (GFEBS)	05	35,468	42,883			42,883	U
146	0604823A	Firefinder	05	25,856	17,294			17,294	U
147	0604827A	Soldier Systems - Warrior Dem/Val	05	10,044	4,803			4,803	U
148	0604852A	Suite of Survivability Enhancement Systems - EMD	05	50,380	85,198			85,198	U
149	0604854A	Artillery Systems - EMD	05	1,722	10,732			10,732	U
150	0605013A	Information Technology Development	05	74,551	88,689			88,689	U
151	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	158,807	102,073			102,073	U
152	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	107,521	83,830			83,830	U
153	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05	3,104	6,699			6,699	U
154	0605030A	Joint Tactical Network Center (JTNC)	05	15,287	15,882			15,882	U
155	0605031A	Joint Tactical Network (JTN)	05	42,134	40,808			40,808	U
156	0605032A	TRACTOR TIRE	05	107,926					U
157	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	4,980	3,847			3,847	U
158	0605034A	Tactical Security System (TSS)	05	4,326	6,928			6,928	U
159	0605035A	Common Infrared Countermeasures (CIRCM)	05	32,025	23,179			23,179	U
160	0605036A	Combating Weapons of Mass Destruction (CWMD)	05	10,883	10,000			10,000	U

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145	0604822A	General Fund Enterprise Business System (GFEBS)	05	21,201				21,201	U
146	0604823A	Firefinder	05	20,008				20,008	U
147	0604827A	Soldier Systems - Warrior Dem/Val	05	6,534				6,534	U
148	0604852A	Suite of Survivability Enhancement Systems - EMD	05	82,459				82,459	U
149	0604854A	Artillery Systems - EMD	05	11,611				11,611	U
150	0605013A	Information Technology Development	05	142,678				142,678	U
151	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	115,286				115,286	U
152	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	96,594				96,594	U
153	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05						U
154	0605030A	Joint Tactical Network Center (JTNC)	05	16,264				16,264	U
155	0605031A	Joint Tactical Network (JTN)	05	31,696				31,696	U
156	0605032A	TRACTOR TIRE	05						U
157	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	5,976				5,976	U
158	0605034A	Tactical Security System (TSS)	05						U
159	0605035A	Common Infrared Countermeasures (CIRCM)	05	23,321		2,300	2,300	25,621	U
160	0605036A	Combating Weapons of Mass Destruction (CWMD)	05						U

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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)	Sec
161	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	14,517	6,054			6,054	U
162	0605041A	Defensive CYBER Tool Development	05	33,796	50,662			50,662	U
163	0605042A	Tactical Network Radio Systems (Low-Tier)	05	18,761	28,404			28,404	U
164	0605047A	Contract Writing System	05	40,341	17,082			17,082	U
165	0605049A	Missile Warning System Modernization (MWSM)	05	7,321	1,539			1,539	U
166	0605051A	Aircraft Survivability Development	05	56,067	55,057		77,420	132,477	U
167	0605052A	Indirect Fire Protection Capability Inc 2 – Block 1	05	92,674	194,366			194,366	U
168	0605053A	Ground Robotics	05	65,311	26,104			26,104	U
169	0605054A	Emerging Technology Initiatives	05	46,451	37,696			37,696	U
170	0605145A	Medical Products and Support Systems Development	05						U
171	0605203A	Army System Development & Demonstration	05		164,883		19,527	184,410	U
172	0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05						U
173	0605380A	AMF Joint Tactical Radio System (JTRS)	05	15,379					U
174	0605450A	Joint Air-to-Ground Missile (JAGM)	05	12,440	6,585			6,585	U
175	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	318,850	208,638			208,638	U

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161	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	4,846				4,846	U
162	0605041A	Defensive CYBER Tool Development	05	28,544				28,544	U
163	0605042A	Tactical Network Radio Systems (Low-Tier)	05	28,178				28,178	U
164	0605047A	Contract Writing System	05	22,860				22,860	U
165	0605049A	Missile Warning System Modernization (MWSM)	05						U
166	0605051A	Aircraft Survivability Development	05	35,893		64,625	64,625	100,518	U
167	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	235,770				235,770	U
168	0605053A	Ground Robotics	05	13,710				13,710	U
169	0605054A	Emerging Technology Initiatives	05	294,739				294,739	U
170	0605145A	Medical Products and Support Systems Development	05	954				954	U
171	0605203A	Army System Development & Demonstration	05	150,201				150,201	U
172	0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05	5,999				5,999	U
173	0605380A	AMF Joint Tactical Radio System (JTRS)	05						U
174	0605450A	Joint Air-to-Ground Missile (JAGM)	05	8,891				8,891	U
175	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	193,929				193,929	U

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176	0605625A	Manned Ground Vehicle	05		205,620			205,620	U
177	0605766A	National Capabilities Integration (MIP)	05	12,340	7,835			7,835	U
178	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05		7,232			7,232	U
179	0605830A	Aviation Ground Support Equipment	05	7,616	1,664			1,664	U
180	0303032A	TROJAN - RH12	05	5,721	3,936			3,936	U
181	0303267A	Auctioned Spectrum Relocation Fund	05	18,381					U
182	0303367A	Spectrum Access Research and Development	05	285					U
183	0304270A	Electronic Warfare Development	05	8,922	15,232		3,200	18,432	U
184	1205117A	Tractor Bears	05	23,170					U
		System Development & Demonstration		3,119,552	2,989,779		100,147	3,089,926	
185	0604256A	Threat Simulator Development	06	46,732	42,117			42,117	U
186	0604258A	Target Systems Development	06	31,286	28,327			28,327	U
187	0604759A	Major T&E Investment	06	79,214	146,565			146,565	U
188	0605103A	Rand Arroyo Center	06	19,071	13,113			13,113	U
189	0605301A	Army Kwajalein Atoll	06	237,414	238,691			238,691	U
190	0605326A	Concepts Experimentation Program	06	30,667	36,922			36,922	U
191	0605502A	Small Business Innovative Research	06	303,386					U
192	0605601A	Army Test Ranges and Facilities	06	311,027	336,468			336,468	U

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176	0605625A	Manned Ground Vehicle	05	327,732				327,732	U
177	0605766A	National Capabilities Integration (MIP)	05	7,670				7,670	U
178	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	1,742				1,742	U
179	0605830A	Aviation Ground Support Equipment	05	1,467				1,467	U
180	0303032A	TROJAN - RH12	05	3,451				3,451	U
181	0303267A	Auctioned Spectrum Relocation Fund	05						U
182	0303367A	Spectrum Access Research and Development	05						U
183	0304270A	Electronic Warfare Development	05	55,855		3,900	3,900	59,755	U
184	1205117A	Tractor Bears	05						U
		System Development & Demonstration		3,199,798		97,825	97,825	3,297,623	
185	0604256A	Threat Simulator Development	06	14,515				14,515	U
186	0604258A	Target Systems Development	06	10,668				10,668	U
187	0604759A	Major T&E Investment	06	106,270				106,270	U
188	0605103A	Rand Arroyo Center	06	13,481				13,481	U
189	0605301A	Army Kwajalein Atoll	06	231,824				231,824	U
190	0605326A	Concepts Experimentation Program	06	54,898				54,898	U
191	0605502A	Small Business Innovative Research	06						U
192	0605601A	Army Test Ranges and Facilities	06	350,359				350,359	U

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193	0605602A	Army Technical Test Instrumentation and Targets	06	82,617	61,974			61,974	U
194	0605604A	Survivability/Lethality Analysis	06	39,886	35,075			35,075	U
195	0605606A	Aircraft Certification	06	3,796	3,461			3,461	U
196	0605702A	Meteorological Support to RDT&E Activities	06	9,495	6,233			6,233	U
197	0605706A	Materiel Systems Analysis	06	21,043	21,342			21,342	U
198	0605709A	Exploitation of Foreign Items	06	15,026	11,168			11,168	U
199	0605712A	Support of Operational Testing	06	52,139	52,723			52,723	U
200	0605716A	Army Evaluation Center	06	56,532	60,815			60,815	U
201	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,708	2,527			2,527	U
202	0605801A	Programwide Activities	06	60,218	58,175			58,175	U
203	0605803A	Technical Information Activities	06	28,237	30,060			30,060	U
204	0605805A	Munitions Standardization, Effectiveness and Safety	06	66,678	54,458			54,458	U
205	0605857A	Environmental Quality Technology Mgmt Support	06	3,138	4,681			4,681	U
206	0605898A	Army Direct Report Headquarters - R&D - MHA	06	53,526	53,820			53,820	U
207	0606001A	Military Ground-Based CREW Technology	06	4,241	2,141			2,141	U
208	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	60,808	62,069			62,069	U

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193	0605602A	Army Technical Test Instrumentation and Targets	06	48,475				48,475	U
194	0605604A	Survivability/Lethality Analysis	06	36,001				36,001	U
195	0605606A	Aircraft Certification	06	2,736				2,736	U
196	0605702A	Meteorological Support to RDT&E Activities	06	6,488				6,488	U
197	0605706A	Materiel Systems Analysis	06	21,859				21,859	U
198	0605709A	Exploitation of Foreign Items	06	7,936		1,000	1,000	8,936	U
199	0605712A	Support of Operational Testing	06	54,470				54,470	U
200	0605716A	Army Evaluation Center	06	63,141				63,141	U
201	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,572				2,572	U
202	0605801A	Programwide Activities	06	87,472				87,472	U
203	0605803A	Technical Information Activities	06	26,244				26,244	U
204	0605805A	Munitions Standardization, Effectiveness and Safety	06	40,133				40,133	U
205	0605857A	Environmental Quality Technology Mgmt Support	06	1,780				1,780	U
206	0605898A	Army Direct Report Headquarters - R&D - MHA	06	55,045				55,045	U
207	0606001A	Military Ground-Based CREW Technology	06						U
208	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	71,306				71,306	U

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209	0606003A	CounterIntel and Human Intel Modernization	06	2,636	1,050		1,875	2,925	U
210	0606105A	Medical Program-Wide Activities	06						U
211	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	88,300	4,500			4,500	U
212	0909980A	Judgment Fund Reimbursement	06	122					U
213	0909999A	Financing for Cancelled Account Adjustments	06	236					U
		Management Support		1,710,179	1,368,475		1,875	1,370,350	
214	0603778A	MLRS Product Improvement Program	07	6,574	14,615			14,615	U
215	0603813A	TRACTOR PULL	07	4,067					U
216	0605024A	Anti-Tamper Technology Support	07	7,159	8,491			8,491	U
217	0607131A	Weapons and Munitions Product Improvement Programs	07	17,992	15,645			15,645	U
218	0607133A	TRACTOR SMOKE	07	12,357					U
219	0607134A	Long Range Precision Fires (LRPF)	07	152,573	156,682			156,682	U
220	0607135A	Apache Product Improvement Program	07	22,914					U
221	0607136A	Blackhawk Product Improvement Program	07	33,906	23,039			23,039	U
222	0607137A	Chinook Product Improvement Program	07	139,003	171,471			171,471	U
223	0607138A	Fixed Wing Product Improvement Program	07	2,146					U
224	0607139A	Improved Turbine Engine Program	07	173,766	206,434			206,434	U

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209	0606003A	CounterIntel and Human Intel Modernization	06	1,063		4,137	4,137	5,200	U
210	0606105A	Medical Program-Wide Activities	06	19,891				19,891	U
211	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	4,496				4,496	U
212	0909980A	Judgment Fund Reimbursement	06						U
213	0909999A	Financing for Cancelled Account Adjustments	06						U
		Management Support		1,333,123		5,137	5,137	1,338,260	
214	0603778A	MLRS Product Improvement Program	07	10,157				10,157	U
215	0603813A	TRACTOR PULL	07						U
216	0605024A	Anti-Tamper Technology Support	07	8,682				8,682	U
217	0607131A	Weapons and Munitions Product Improvement Programs	07	20,409				20,409	U
218	0607133A	TRACTOR SMOKE	07						U
219	0607134A	Long Range Precision Fires (LRPF)	07	122,733				122,733	U
220	0607135A	Apache Product Improvement Program	07						U
221	0607136A	Blackhawk Product Improvement Program	07	11,236				11,236	U
222	0607137A	Chinook Product Improvement Program	07	46,091				46,091	U
223	0607138A	Fixed Wing Product Improvement Program	07						U
224	0607139A	Improved Turbine Engine Program	07	249,257				249,257	U

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225	0607142A	Aviation Rocket System Product Improvement and Development	07	35,211	1,927			1,927	U
226	0607143A	Unmanned Aircraft System Universal Products	07	36,488	18,132			18,132	U
227	0607145A	Apache Future Development	07		5,448			5,448	U
228	0607150A	Intel Cyber Development	07						U
229	0607312A	Army Operational Systems Development	07		45,026			45,026	U
230	0607665A	Family of Biometrics	07	2,320	1,702			1,702	U
231	0607865A	Patriot Product Improvement	07	72,895	87,430			87,430	U
232	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07	29,782	47,398			47,398	U
233	0203735A	Combat Vehicle Improvement Programs	07	321,513	277,633			277,633	U
234	0203743A	155mm Self-Propelled Howitzer Improvements	07	35,681	199,274			199,274	U
235	0203744A	Aircraft Modifications/Product Improvement Programs	07	13,629	9,278			9,278	U
236	0203752A	Aircraft Engine Component Improvement Program	07	146	144			144	U
237	0203758A	Digitization	07	6,077	5,270			5,270	U
238	0203801A	Missile/Air Defense Product Improvement Program	07	3,588	1,287			1,287	U
239	0203802A	Other Missile Product Improvement Programs	07	4,760					U
240	0203808A	TRACTOR CARD	07	34,050					U

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225	0607142A	Aviation Rocket System Product Improvement and Development	07	17,155				17,155	U
226	0607143A	Unmanned Aircraft System Universal Products	07	7,743				7,743	U
227	0607145A	Apache Future Development	07	77,177				77,177	U
228	0607150A	Intel Cyber Development	07	14,652				14,652	U
229	0607312A	Army Operational Systems Development	07	35,851				35,851	U
230	0607665A	Family of Biometrics	07	1,324				1,324	U
231	0607865A	Patriot Product Improvement	07	187,840				187,840	U
232	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07	44,691				44,691	U
233	0203735A	Combat Vehicle Improvement Programs	07	268,919				268,919	U
234	0203743A	155mm Self-Propelled Howitzer Improvements	07	427,254				427,254	U
235	0203744A	Aircraft Modifications/Product Improvement Programs	07	11,688				11,688	U
236	0203752A	Aircraft Engine Component Improvement Program	07	80				80	U
237	0203758A	Digitization	07	4,516				4,516	U
238	0203801A	Missile/Air Defense Product Improvement Program	07	1,288				1,288	U
239	0203802A	Other Missile Product Improvement Programs	07	79,424		2,300	2,300	81,724	U
240	0203808A	TRACTOR CARD	07						U

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

Appropriation: 2040A Research, Development, Test & Eval, Army

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)	S e c I
241	0205402A	Integrated Base Defense - Operational System Dev	07	8,000					U
242	0205410A	Materials Handling Equipment	07	1,132					U
243	0205412A	Environmental Quality Technology - Operational System Dev	07	249	10,000			10,000	U
244	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	74,295	97,746			97,746	U
245	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	113,471	117,294			117,294	U
246	0208053A	Joint Tactical Ground System	07						U
248	0303028A	Security and Intelligence Activities	07	40,002	13,845		12,904	26,749	U
249	0303140A	Information Systems Security Program	07	40,148	25,710			25,710	U
250	0303141A	Global Combat Support System	07	51,415	60,076			60,076	U
251	0303142A	SATCOM Ground Environment (SPACE)	07						U
252	0303150A	WWMCCS/Global Command and Control System	07	1,966	2,073			2,073	U
255	0305172A	Combined Advanced Applications	07	1,500					U
256	0305179A	Integrated Broadcast Service (IBS)	07	450	459			459	U
257	0305204A	Tactical Unmanned Aerial Vehicles	07	6,000	5,097		17,050	22,147	U
258	0305206A	Airborne Reconnaissance Systems	07	26,416	11,177		2,000	13,177	U
259	0305208A	Distributed Common Ground/Surface Systems	07	27,109	28,821			28,821	U
260	0305219A	MQ-1C Gray Eagle UAS	07		5,000			5,000	U

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

Appropriation: 2040A Research, Development, Test & Eval, Army

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
241	0205402A	Integrated Base Defense - Operational System Dev	07						U
242	0205410A	Materials Handling Equipment	07						U
243	0205412A	Environmental Quality Technology - Operational System Dev	07	259				259	U
244	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	166				166	U
245	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	75,575				75,575	U
246	0208053A	Joint Tactical Ground System	07	9,510				9,510	U
248	0303028A	Security and Intelligence Activities	07			23,367	23,367	23,367	U
249	0303140A	Information Systems Security Program	07	29,270				29,270	U
250	0303141A	Global Combat Support System	07	86,908				86,908	U
251	0303142A	SATCOM Ground Environment (SPACE)	07	18,684				18,684	U
252	0303150A	WWMCCS/Global Command and Control System	07						U
255	0305172A	Combined Advanced Applications	07						U
256	0305179A	Integrated Broadcast Service (IBS)	07	467				467	U
257	0305204A	Tactical Unmanned Aerial Vehicles	07	4,051		34,100	34,100	38,151	U
258	0305206A	Airborne Reconnaissance Systems	07	13,283		15,575	15,575	28,858	U
259	0305208A	Distributed Common Ground/Surface Systems	07	47,204				47,204	U
260	0305219A	MQ-1C Gray Eagle UAS	07						U

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

Appropriation: 2040A Research, Development, Test & Eval, Army

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)	S e c
261	0305232A	RQ-11 UAV	07	6,180	3,218			3,218	U
262	0305233A	RQ-7 UAV	07	17,863	7,817			7,817	U
263	0307665A	Biometrics Enabled Intelligence	07	6,524	2,000		2,214	4,214	U
264	0708045A	End Item Industrial Preparedness Activities	07	106,766	108,348			108,348	U
265	1203142A	SATCOM Ground Environment (SPACE)	07	9,927	34,169			34,169	U
266	1208053A	Joint Tactical Ground System	07	7,400	7,677			7,677	U
9999	9999999999	Classified Programs		5,955	7,273			7,273	U
		Operational Systems Development		1,721,365	1,844,126		34,168	1,878,294	
267	0608041A	Defensive CYBER - Software Prototype Development	08						U
		Software and Digital Technology Pilot Program							
		Total Research, Development, Test & Eval, Army		11,371,268	12,543,435		147,304	12,690,739	

R-121PB: FY 2021 President's Budget (Published Version), as of January 17, 2020 at 11:58:58

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

Appropriation: 2040A Research, Development, Test & Eval, Army

Line Program Element No Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	S e c
261 0305232A	RQ-11 UAV	07						U
262 0305233A	RQ-7 UAV	07						U
263 0307665A	Biometrics Enabled Intelligence	07						U
264 0708045A	End Item Industrial Preparedness Activities	07	61,012				61,012	U
265 1203142A	SATCOM Ground Environment (SPACE)	07						U
266 1208053A	Joint Tactical Ground System	07						U
9999 999999999	Classified Programs		3,983				3,983	U
	Operational Systems Development		1,998,539		75,342	75,342	2,073,881	
267 0608041A	Defensive CYBER - Software Prototype Development	08	46,445				46,445	U
	Software and Digital Technology Pilot Program		46,445				46,445	
	Total Research, Development, Test & Eval, Army		12,587,343		182,824	182,824	12,770,167	

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

Appropriation 2040: Research, Development, Test & Evaluation, Army

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army										Date: February 2020	

Appropriation/Budget Activity					R-1 Program Element (Number/Name)						
2040: *Research, Development, Test & Evaluation, Army I BA 8: Software and Digital Technology Pilot Programs*					PE 0608041A *I Defensive CYBER - Software Prototype 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
Total Program Element	-	0.000	0.000	46.445	-	46.445	115.064	109.787	105.851	92.632	0.000	469.779
CD1: *Defensive Cyber - Software Prototype Devel*	-	0.000	0.000	46.445	-	46.445	115.064	109.787	105.851	92.632	0.000	469.779

Note

Defensive Cyber Operations (DCO) programs were selected as a candidate for the BA8 Software RDT&E Appropriation Pilot Program in FY 2021. These efforts are a continuation and transfer from RDTE PE 0605041A EV5, OPA PE 0128B63000, and OMA SAG 151251. Cyber Situational Understanding (SU), DCO Development Environment (DCODE) (formerly Forge), and non-software Army Cyber Command (ARCYBER) Rapid Cyber Prototyping are not part of the Software Pilot and remain within RDTE PE 0605041A. In addition, Garrison Defensive Platforms (GDP) and Deployable DCO Systems (DDS) remain within OPA PE 0128B63000.

A. Mission Description and Budget Item Justification

Defensive Cyber Operations (DCO) supports the Army Network Modernization Strategy Line of Effort (LOE) Key Enabler for Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy. The DCO budget line includes funding for Program Executive Office Command Control and Communications - Tactical (PEO C3T) Tactical DCO Infrastructure (TDI); Program Executive Office Enterprise Information Systems (PEO EIS) Defensive Cyber Operations; and Army Cyber Command (ARCYBER) Rapid Cyber Prototyping.

Platforms/Levels:
* DCO - Tactical DCO Infrastructure (TDI) - (PEO C3T) - Tactical/Command Post Level
* DCO - Cyberspace Analytics - (PEO EIS) - (Gabriel Nimbus) - Strategic Level (Army Cyberspace Operations and Integration Center (ACOIC))

Defensive Cyber Tools and Analytics:
* DCO - Cyberspace Analytics - (PEO EIS) - Strategic Level (ACOIC)
* DCO - Mission Planning - (PEO EIS) - Strategic Level
* DCO - Tools Suite - (PEO EIS) - Garrison/Tactical Level
* DCO - User Activity Monitoring - (PEO EIS) - Strategic Level
* DCO - Forensics and Malware Analysis - (PEO EIS) - Garrison/Tactical Level
* DCO - Threat Emulation - (PEO EIS) - Strategic Level (Training)

- Tactical DCO Infrastructure (TDI) is a software-only program, which consists of pre-configured DCO tools residing on the Tactical Server Infrastructure (TSI). The TDI capability will reside within the Command Post at echelon Corps through Brigade for both organic Cyber Network Defenders as well as remote access by Cyber Protection teams (CPT) to support defense of the Tactical Network.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER - Software Prototype Development*

- Defensive Cyber Operations (DCO) consists of platform and software programs which are key elements of the DCO Maneuver Baseline infrastructure, platform, and tools. The employment of defensive capabilities creates specific effects in cyberspace through actions that allow commanders to achieve the following objectives: deter, destroy, and defeat enemy offensive cyberspace operations; gain time; economy of force; control key terrain; protect tasked critical assets and infrastructure; and develop intelligence. DCO supports the Army Cyber Command (ARCYBER), ACOIC, (5) Regional Cyber Centers (RCCs), Cyber Warfare Battalion (CWB), Multi-Domain Task Force (MDTF), Cyber Protection Brigade (CPB), and (41) Cyber Protection Teams (CPTs) in COMPO 1/2/3.

- ARCYBER Rapid Cyber Prototyping provides software based capabilities that can quickly respond to emerging cyber threats and keep up with threat technology. ARCYBER identifies potential development and prototyping efforts via Cyber Needs Forms (CNFs) based on operational feedback, changes in tactics techniques and procedures (TTPs), and trends of adversarial activity. These are separate and distinct from DCO programs identified and are used to rapidly address a network threat/vulnerability.

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	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	46.445	-	46.445
Total Adjustments	0.000	0.000	46.445	-	46.445
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	46.445	-	46.445

Change Summary Explanation

FY21 funding in the amount of $46.445 million was realigned to the Software RDTE Appropriation Pilot Program.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army											Date: February 2020	
Appropriation/Budget Activity 2040 I 8				**R-1 Program Element (Number/Name)** PE 0608041A I *Defensive CYBER -* *Software Prototype Development*					**Project (Number/Name)** CD1 I *Defensive Cyber - Software Prototype* *Devel*			
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**
CD1: *Defensive Cyber -* *Software Prototype Devel*	-	0.000	0.000	46.445	-	46.445	115.064	109.787	105.851	92.632	0.000	469.779

Note

Defensive Cyber Operations (DCO) programs were selected as a candidate for the BA8 Software RDT&E Appropriation Pilot Program in FY 2021. These efforts are a continuation and transfer from RDTE PE 0605041A EV5, OPA PE 0128B63000, and OMA SAG 151251. Cyber Situational Understanding (SU), DCO Development Environment (DCODE) (formerly Forge), and non-software Army Cyber Command (ARCYBER) Rapid Cyber Prototyping are not part of the Software Pilot and remain within RDTE PE 0605041A. In addition, Garrison Defensive Platforms (GDP) and Deployable DCO Systems (DDS) remain within OPA PE 0128B63000.

A. Mission Description and Budget Item Justification

Defensive Cyber Operations (DCO) supports the Army Network Modernization Strategy Line of Effort (LOE) Key Enabler for Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy. The DCO budget line includes funding for Program Executive Office Command Control and Communications - Tactical (PEO C3T) Tactical DCO Infrastructure (TDI); Program Executive Office Enterprise Information Systems (PEO EIS) Defensive Cyber Operations; and Army Cyber Command (ARCYBER) Rapid Cyber Prototyping.

Platforms/Levels:
* DCO - Tactical DCO Infrastructure (TDI) - (PEO C3T) - Tactical/Command Post Level
* DCO - Cyberspace Analytics - (PEO EIS) - (Gabriel Nimbus) - Strategic Level (Army Cyberspace Operations and Integration Center (ACOIC))

Defensive Cyber Tools and Analytics:
* DCO - Cyberspace Analytics - (PEO EIS) - Strategic Level (ACOIC)
* DCO - Mission Planning - (PEO EIS) - Strategic Level
* DCO - Tools Suite - (PEO EIS) - Garrison/Tactical Level
* DCO - User Activity Monitoring - (PEO EIS) - Strategic Level
* DCO - Forensics and Malware Analysis - (PEO EIS) - Garrison/Tactical Level
* DCO - Threat Emulation - (PEO EIS) - Strategic Level (Training)

- Tactical DCO Infrastructure (TDI) is a software-only program, which consists of pre-configured DCO tools residing on the Tactical Server Infrastructure (TSI). The TDI capability will reside within the Command Post at echelon Corps through Brigade for both organic Cyber Network Defenders as well as remote access by Cyber Protection teams (CPT) to support defense of the Tactical Network.

- Defensive Cyber Operations (DCO) consists of platform and software programs which are key elements of the DCO Maneuver Baseline infrastructure, platform, and tools. The employment of defensive capabilities creates specific effects in cyberspace through actions that allow commanders to achieve the following objectives:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype* *Devel*

deter, destroy, and defeat enemy offensive cyberspace operations; gain time; economy of force; control key terrain; protect tasked critical assets and infrastructure; and develop intelligence. DCO supports the Army Cyber Command (ARCYBER), ACOIC, (5) Regional Cyber Centers (RCCs), Cyber Warfare Battalion (CWB), Multi-Domain Task Force (MDTF), Cyber Protection Brigade (CPB), and (41) Cyber Protection Teams (CPTs) in COMPO 1/2/3.

- ARCYBER Rapid Cyber Prototyping provides software based capabilities that can quickly respond to emerging cyber threats and keep up with threat technology. ARCYBER identifies potential development and prototyping efforts via Cyber Needs Forms (CNFs) based on operational feedback, changes in tactics techniques and procedures (TTPs), and trends of adversarial activity. These are separate and distinct from DCO programs identified and are used to rapidly address a network threat/ vulnerability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Defensive Cyber Operations (DCO) - Tactical DCO Infrastructure (TDI) (PEO C3T)	-	-	5.000
Description: DCO Tactical DCO Infrastructure is a software-only program which consists of pre-configured DCO Tools on the Tactical Server Infrastructure (TSI) residing within the Command Post, at Brigade through Corps, for both organic Cyber Network Defenders as well as remote access by Cyber Protection Teams (CPTs) to support defense of the tactical network.			
FY 2021 Plans: FY 2021 funding supports development engineering, integration and testing of Capability Drop 2 (CD 2). CD 2 will integrate the enhanced DCO tool suite that will leverage machine learning and expand the data collection beyond the command post to the extended tactical network. Finalize integration of current DCO remote operations capability to facilitate timely escalation of remote incident response.			
FY 2020 to FY 2021 Increase/Decrease Statement: These efforts are a continuation of and transfer from RDTE PE 0605041A EV5. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.			
Title: Defensive Cyber Operations - Cyber Analytics (PEO EIS)	-	-	9.490
Description: DCO Cyberspace Analytics Big Data Platform (BDP) is a scalable software based capability hosted in the cloud, called Gabriel Nimbus (GN), which offers interfaces and visualization accessible by cyberspace defenders at all levels to facilitate counter-reconnaissance activities meant to discover the presence of advanced or sophisticated cyber threats and vulnerabilities.			
FY 2021 Plans: FY 2021 funding supports software and modification to BDP/GN to include engineering, integration, and testing of capability releases and capability drops. These software upgrades have been approved by Configuration Control Board (CCB) to be included in the Army's BDP which Soldiers are using today. Provides Cross Domain Solution between Network Internet Protocol Router (NIPR), Secret Internet Protocol Router (SIPR), and Joint Worldwide Intelligence Communications Systems (JWICS). Enables separate organizations at multiple echelons to develop mutually supporting cyberspace analytics independently. Enriches			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020	
Appropriation/Budget Activity 2040 / 8	R-1 Program Element (Number/Name) PE 0608041A / Defensive CYBER - Software Prototype Development		Project (Number/Name) CD1 / Defensive Cyber - Software Prototype Devel	

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
and stores data for follow-on correlation and analysis to determine the presence of anomalous network activity and understand the associated impacts. Facilitates the identification of threat trends, behavior patterns, and tactics, techniques, and procedures associated with relevant portions of the designated network. Ingests multitudes of data sources, and turns that data into visual information in order to detect and illuminate adversaries. Key to mission success is the collection of data on our platforms and the integration with GN through the Lower Echelon Analytic Platform (LEAP) which are vital to achieve this vision. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** These efforts are a continuation of and transfer from RDTE PE 0605041A EV5. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.			
Title: Defensive Cyber Operations (DCO) - Mission Planning (PEO EIS) ***Description:*** DCO Mission Planning (DCOMP) solution acts as the lead application integrator for the Army's Big Data Platform. It is a software application-based, scalable warfighting capability for ACOIC mission and planning at the tactical and strategic levels. ***FY 2021 Plans:*** FY 2021 funding supports development engineering, integration, and testing of three capability releases (software upgrades). Delivers mission command and planning at all levels supporting Cyber Defense Forces. Creates a DCO mission execution framework by utilizing PhalanX to collaborate, understand, plan, and manage DCO missions in real-time. Provides on-demand capabilities available within capability libraries matched to the overall effects requested by Commanders. Offers shared situational awareness amongst cyberspace defenders about their missions and area of operations. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** These efforts are a continuation of and transfer from RDTE PE 0605041A EV5. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.	-	-	4.700
Title: Defensive Cyber Operations (DCO) - Tools Suite (PEO EIS) ***Description:*** DCO Tools Suite is a flexible and dynamic software based suite of warfighting capabilities that enables CPTs, RCCs, and in some cases local defenders to perform DCO and cybersecurity actions. DCO tools consists of prepositioned and tailorable software packages that are integrated and available at all echelons to support or directly cause effects through the execution of Cyber Mission Force and cyberspace workforce tasks. They are executed or managed within a DCO platform. ***FY 2021 Plans:*** FY 2021 funding supports procurement, development engineering, integration, and testing of DCO Tools Suite v5.0 and v6.0 (perpetual, subscription, and open source tools like Redhat, Redseal, Cobalt Strike, Splunk, Carbon Black, Forescout, Aspera, and Emerging Threat Pro). Employs defeat mechanisms to destroy, dislocate, disintegrate and isolate cyberspace threats/ vulnerabilities. Conducts full range of military operations and ensures use of key terrain in cyberspace. Gains and maintains the	-	-	17.900

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype* *Devel*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
advantage and places adversaries at disadvantage in increasingly congested/contested space, cyberspace, and electromagnetic spectrum. Without these tools cyber defenders will not be able to conduct Network Mapping, Event Correlation, Threat Emulation, Endpoint Security, Massive Data Transference, Terrain Analysis, Continuous Monitoring, Intel Support, and DEVSECOPS. Threat Deception (formerly known as Counter Infiltration) has been added as a Capability Drop which identifies and block infiltration attempts. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** These efforts are a continuation of and transfer from OPA PE 0128B63000 and OMA SAG 151251. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.			
Title: Defensive Cyber Operations (DCO) - User Activity Monitoring (PEO EIS) ***Description:*** DCO User Activity Monitoring is the primary capability within the Army's overall Insider Threat program. UAM is primarily a software-based, scalable solution (some hardware in the on-premise solution) that proactively identifies and mitigates internal risks associated with the theft or misuse of critical, mission essential data. It utilizes an integrated approach with a centralized UAM cell sending data to a core Insider Threat Hub. ***FY 2021 Plans:*** FY 2021 funding supports development engineering, integration, and testing of two capability drops (on-premise solution). Provides protection against insider threat through the deployment of capability in defense of our most critical networks. Proactively identifies and mitigates internal risks associated with the theft or misuse of critical, mission essential data. Assists with the establishment of the Army's Insider Threat (InT) Protection Program that utilizes full-spectrum solutions to assess, deter, deny, defend, defeat, and evolve against the insider threat. Facilitates the ability to identify insiders threats based on policy violations, as well as the capturing of certain risk behaviors that rate the likelihood of an incident caused by a trusted insider. Integrates behavioral based analysis capability through the use of GN. The Army will implement UAM for all Soldiers, civilians, and contractors with access to JWICS and SIPRNet. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** These efforts are a continuation of and transfer from RDTE PE 0605041A EV5. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.	-	-	2.550
Title: Defensive Cyber Operations (DCO) - Forensics and Malware Analysis (PEO EIS) ***Description:*** DCO Forensics and Malware Analysis capability is a software/hardware based solution enabling global, regional, and local cyberspace defenders to perform forensics either remotely or locally. Forensics is evidence related and Malware capabilities provides a sandboxlike, virtual environment that allows for the conduct of real-time, automated and dynamic malware decomposition and behavior analysis. Forensics gives cyberspace defenders the ability to collect, process, search, and analyze	-	-	3.020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		**Date:** February 2020
Appropriation/Budget Activity 2040 / 8	**R-1 Program Element (Number/Name)** PE 0608041A / *Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 / *Defensive Cyber - Software Prototype* *Devel*

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021**
evidence from portable electronic devices, removable media, system hard drives, and random access memory. This process rapidly triages an incident and place the impacted system(s) back in service. *FY 2021 Plans:* FY 2021 funding supports development engineering, integration, and testing of capability drops for initial operating capability (IOC) in 2Q21. Deploys forensics capability within each theater of operation enabling the RCC and CPTs to conduct live forensics on critical assets. Provides capability to collect and examine data either remotely or locally using a repeatable and defensible process to include (1) triage - ability to quickly view and conduct comprehensive searching on potential evidence; (2) evidence acquisition - provides centralized-node enterprise in which analysts can preview, acquire, and analyze evidence remotely and locally; (3) data processing - provides processing capabilities that can automate the preparation of evidence; (4) analysis - allows a semi-automated capability to analyze file systems, compressed files, timelines, web histories, recycle bins, memory, disks, logs, registries, and other artifacts; and (5) reporting - provides flexible reporting framework that empowers analysts to tailor their case report. *FY 2020 to FY 2021 Increase/Decrease Statement:* These efforts are a continuation of and transfer from OPA PE 0128B63000. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.			
Title: Defensive Cyber Operations (DCO) - Threat Emulation (PEO EIS) *Description:* DCO Threat Emulation capability is a software based suite of tools used to gain access to evaluated networks and through multi-vectors of unknown, partially known, or known access methods. Threat Emulation will enable the implementation of real world threat tactics, techniques, and procedures (TTPs) against risk areas such as web services, endpoints, passwords and identities, phishing and social engineering, mobile devices, and wired/wireless network systems in order to reveal critical security exposures. *FY 2021 Plans:* FY 2021 funding supports development engineering, integration, and testing. It provides software based capability that will allow CPTs to not only asses the ability of systems to withstand an advance persistent threat actor attack by evaluating the people and processes. Enables the implementation of real world threat TTPs against risk areas such as web services, endpoints, passwords and identities, phishing and social engineering, mobile devices, and wired/wireless network systems in order to reveal critical security exposures. Exists within a contemporary operational environment consisting of a collective set of conditions, derived from a composite of actual worldwide conditions that pose realistic challenges for training, leader development, and capabilities development. *FY 2020 to FY 2021 Increase/Decrease Statement:*	-	-	1.600

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020	
Appropriation/Budget Activity 2040 I 8	R-1 Program Element (Number/Name) PE 0608041A I Defensive CYBER - Software Prototype Development	Project (Number/Name) CD1 I Defensive Cyber - Software Prototype Devel	

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
These efforts are a continuation of and transfer from RDTE PE 0605041A EV5. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.			
Title: Defensive Cyber Operations (DCO) - Management Services (PEO EIS) **Description:** Program management services consists of System Engineering and Technical Assistance (SETA) contractors and government/contract matrix support from Software Engineering Center (SEC), Information Systems Engineering Command (ISEC), and Army Test and Evaluation Command (ATEC) for development engineering, integration, and testing of software based DCO capabilities. **FY 2021 Plans:** FY 2021 funding provides continued program management services and support. **FY 2020 to FY 2021 Increase/Decrease Statement:** These efforts are a continuation of and transfer from RDTE PE 0605041A EV5. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.	-	-	1.720
Title: Defensive Cyber Operations (DCO) - Rapid Cyber Prototyping (ARCYBER) **Description:** ARCYBER Rapid Cyber Prototyping provides software based capabilities that can quickly respond to emerging cyber threats and keep up with threat technology. ARCYBER identifies potential development and prototyping efforts via Cyber Needs Forms (CNFs) based on operational feedback, changes in TTPs, and trends of adversarial activity. These are separate and distinct from DCO programs identified and are used to rapidly address a network threat/vulnerability. **FY 2021 Plans:** FY 2021 funding supports the procurement and modification of software based Emerging Threat Response Development tools. **FY 2020 to FY 2021 Increase/Decrease Statement:** These efforts are a continuation of and transfer from OPA PE 0128B63000. FY 2021 is the first year of the BA8 Software RDT&E Appropriation Pilot Program.	-	-	0.465
Accomplishments/Planned Programs Subtotals	-	-	46.445

C. Other Program Funding Summary ($ in Millions)
 N/A

Remarks
 - Realigned $25.060 million FY21 RDTE from PE 0605041A to Software RDTE Appropriation Pilot Program:
 * Tactical DCO Infrastructure $5.000 million

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 8	**R-1 Program Element (Number/Name)** PE 0608041A / *Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 / *Defensive Cyber - Software Prototype* *Devel*

C. Other Program Funding Summary ($ in Millions)
 * Cyber Analytics $9.490 million
 * User Activity Monitoring $2.550 million
 * Mission Planning $4.700 million
 * Threat Emulation $1.600 million
 * DCO Management Services $1.720 million

 - Realigned $16.593 million FY21 OPA from PE 0128B63000 to Software RDTE Appropriation Pilot Program:
 * DCO Tools Suite $13.108 million
 * Forensics and Malware $3.020 million
 * ARCYBER Rapid Cyber Prototyping $0.465 million

 - Realigned $4.792 million FY21 OMA from SAG 151251 to Software RDTE Appropriation Pilot Program:
 * DCO Tools Suite $4.792 million

D. Acquisition Strategy

The DCO Information System Capabilities Development Document (IS ICD) was approved on 19 Dec 17 by the Army Requirements Oversight Council (AROC). DCO programs are under an IT Box construct with five year term (FY18-22) which aligns with current Requirements Definition Package (RDP).

The Milestone Decision Authority (MDA), approved the Materiel Development Decision (MDD) on 13 Apr 18, designating Tactical DCO Infrastructure (TDI) as an ACAT III program. The TDI program's RDP was approved on 8 Nov 18 by the Army Requirement Board (ARB). Under subsequent reviews, the MDA approved a tailored defense unique software intensive acquisition approach for TDI. To support this agile acquisition approach, the TDI program office will develop and deploy pre-configured software in a series of capability drops in order to deliver full functional values of the RDP that align with DCO priorities. The TDI program had a Full Deployment Decision (FDD) of TDI's initial capability approved by the MDA on Sep 19, which allowed the program to achieve IOC Oct 19. TDI is hosted on the Tactical Server Infrastructure (TSI) and will be fielded by the CPCE/TSI program in accordance with their fielding schedule. Execution of the TDI program will be a combination of government entities and commercial vendors.

The ARB approved Cyber Analytics and DCO Tool Suite RDPs on 24 Apr 18; Mission Planning on 26 Jun 18; and User Activity Monitoring and Forensics and Malware on 16 Oct 18. The MDA designated these as ACAT IV programs. Under subsequent reviews, the MDA approved agile acquisition approach to develop and deliver pre-configured software in a series of releases and capability drops in order to deliver full functional values of the RDP that align with DCO priorities. DCO programs utilize standard and 874 agile pilot evolutionary acquisition processes (30-90 rapid acquisition approach). DCO continually delivers new technologies and capabilities as a prototype and fields updated capabilities. DCO contract strategy utilizes multiple existing contracts vehicles to include Other Transactional Authority (OTA), Federal Acquisition Regulation (FAR)-based, Blanket Purchase Agreement (BPA), and Basic Ordering Agreement (BOA).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army | | | | | | | | | | | Date: February 2020 | | |

| Appropriation/Budget Activity 2040 / 8 | R-1 Program Element (Number/Name) PE 0608041A / Defensive CYBER - Software Prototype Development | Project (Number/Name) CD1 / Defensive Cyber - Software Prototype Devel |

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCO -Tactical DCO Infrastructure (TDI) (PEO C3T)	C/FFP	CACI : Aberdeen Proving Ground, (APG) MD	-	-		-		0.378		-		0.378	0.000	0.378	-
DCO - Management Services (PEO EIS)	SS/TBD	Various : Various	-	-		-		1.720		-		1.720	0.000	1.720	-
Subtotal			-	-		-		2.098		-		2.098	0.000	2.098	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCO - Tactical DCO Infraastructure (TDI) (PEO C3T)	C/CPFF	Parsons and CACI : ACC-RI: IL	-	-		-		3.468		-		3.468	0.000	3.468	-
DCO - Cyber Analytics (PEO EIS)	C/FFP	Army Contracting Command - Rock Island (ACC-RI) : Rock Island, IL	-	-		-		9.490		-		9.490	0.000	9.490	-
DCO - Tools Suite (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		-		17.900		-		17.900	0.000	17.900	-
DCO - Mission Planning (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		-		4.700		-		4.700	0.000	4.700	-
DCO - User Activity Monitoring (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		-		2.550		-		2.550	0.000	2.550	-
DCO - Forensics and Malware (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		-		3.020		-		3.020	0.000	3.020	-
DCO - Threat Emulation (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		-		1.600		-		1.600	0.000	1.600	-
DCO - Rapid Cyber Prototyping (ARCYBER)	C/FFP	ACC-RI : Rock Island, IL	-	-		-		0.465		-		0.465	0.000	0.465	-
Subtotal			-	-		-		43.193		-		43.193	0.000	43.193	N/A

Exhibit R-3, **RDT&E Project Cost Analysis:** PB 2021 Army			**Date:** February 2020									
Appropriation/Budget Activity 2040 / 8				**R-1 Program Element (Number/Name)** PE 0608041A / *Defensive CYBER -* *Software Prototype Development*				**Project (Number/Name)** CD1 / *Defensive Cyber - Software Prototype* *Devel*				

Support ($ 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**
DCO - Tactical Development Infrastructure (TDI) (PEO C3T)	MIPR	DLA : Philadelphia, PA	-	-		-		0.115		-		0.115	0.000	0.115	-
Subtotal			-	-		-		0.115		-		0.115	0.000	0.115	N/A

Test and Evaluation ($ 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**
DCO - Tactical Development Infrastructure (TDI) (PEO C3T)	MIPR	ATEC : Aberdeen Proving Ground, (APG) MD	-	-		-		1.039		-		1.039	0.000	1.039	-
Subtotal			-	-		-		1.039		-		1.039	0.000	1.039	N/A

	Prior Years	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**Cost To Complete**	**Total Cost**	**Target Value of Contract**
Project Cost Totals	-	-	0.000	46.445	-	46.445	0.000	46.445	N/A

Remarks

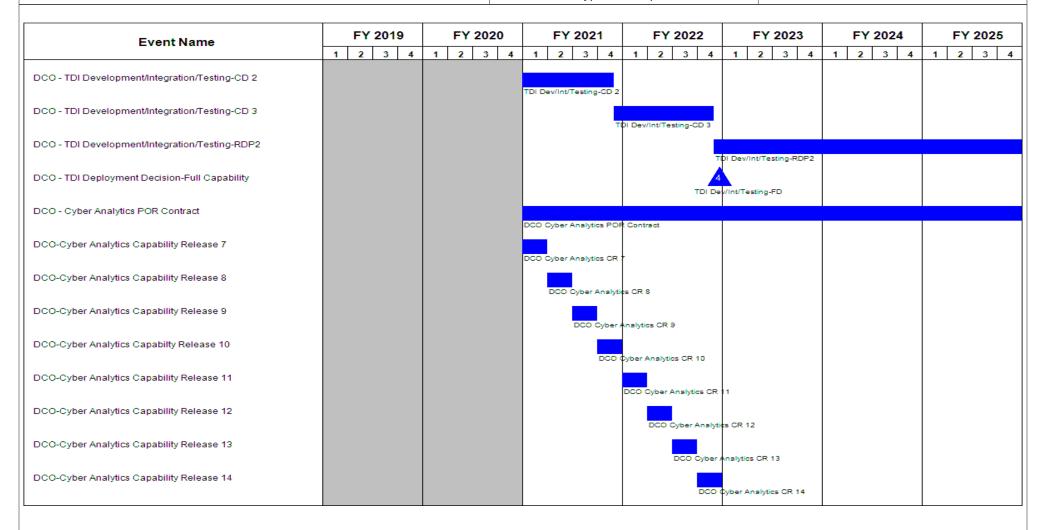| Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 I 8	**R-1 Program Element (Number/Name)** PE 0608041A I *Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 I *Defensive Cyber - Software Prototype* *Devel*

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				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
DCO - TDI Development/Integration/Testing-CD 2																												
DCO - TDI Development/Integration/Testing-CD 3																												
DCO - TDI Development/Integration/Testing-RDP2																												
DCO - TDI Deployment Decision-Full Capability																												
DCO - Cyber Analytics POR Contract																												
DCO-Cyber Analytics Capability Release 7																												
DCO-Cyber Analytics Capability Release 8																												
DCO-Cyber Analytics Capability Release 9																												
DCO-Cyber Analytics Capabilty Release 10																												
DCO-Cyber Analytics Capability Release 11																												
DCO-Cyber Analytics Capability Release 12																												
DCO-Cyber Analytics Capability Release 13																												
DCO-Cyber Analytics Capability Release 14																												

Schedule bars:
- TDI Dev/Int/Testing-CD 2 (FY2021 Q1–Q3)
- TDI Dev/Int/Testing-CD 3 (FY2021 Q4–FY2022 Q2)
- TDI Dev/Int/Testing-RDP2 (FY2022 Q4–FY2025 Q4)
- TDI Dev/Int/Testing-FD (milestone "4" at FY2022 Q4)
- DCO Cyber Analytics POR Contract (FY2021 Q1–FY2023 Q4)
- DCO Cyber Analytics CR 7 (FY2021 Q1)
- DCO Cyber Analytics CR 8 (FY2021 Q2)
- DCO Cyber Analytics CR 9 (FY2021 Q3)
- DCO Cyber Analytics CR 10 (FY2021 Q4)
- DCO Cyber Analytics CR 11 (FY2022 Q1)
- DCO Cyber Analytics CR 12 (FY2022 Q2)
- DCO Cyber Analytics CR 13 (FY2022 Q3)
- DCO Cyber Analytics CR 14 (FY2022 Q4)

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		**Date:** February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype* *Devel*

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 8	R-1 Program Element (Number/Name) PE 0608041A / Defensive CYBER - Software Prototype Development	Project (Number/Name) CD1 / Defensive Cyber - Software Prototype Devel

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		**Date:** February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype* *Devel*

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				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

DCO-Threat Emulation Capability Drop 6

DCO Threat Emulation CD 6

DCO-Threat Emulation Capability Drop 7

DCO Threat Emulation CD 7

DCO-Threat Emulation-Full Operational Capability

DCO Threat Emulation-FOC

Note
  Tactical DCO Infrastructure: Full Deployment is defined as when TDI has completed the development and testing of the last capability drop within the IT Box (reaching full functional values of the RDP) and has transferred the capability to the CPCE/TSI program to commence fielding.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		**Date:** February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER - Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype Devel*

Current DCO IT box ends in FY22. TCM is working a new DCO IS ICD to align with a new IT Box construct for FY23-27.

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Army		**Date:** February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype* *Devel*

Schedule Details

Events	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
DCO - TDI Development/Integration/Testing-CD 2	1	2021	4	2021
DCO - TDI Development/Integration/Testing-CD 3	4	2021	4	2022
DCO - TDI Development/Integration/Testing-RDP2	4	2022	4	2025
DCO - TDI Deployment Decision-Full Capability	4	2022	4	2022
DCO - Cyber Analytics POR Contract	1	2021	4	2025
DCO-Cyber Analytics Capability Release 7	1	2021	1	2021
DCO-Cyber Analytics Capability Release 8	2	2021	2	2021
DCO-Cyber Analytics Capability Release 9	3	2021	3	2021
DCO-Cyber Analytics Capabilty Release 10	4	2021	4	2021
DCO-Cyber Analytics Capability Release 11	1	2022	1	2022
DCO-Cyber Analytics Capability Release 12	2	2022	2	2022
DCO-Cyber Analytics Capability Release 13	3	2022	3	2022
DCO-Cyber Analytics Capability Release 14	4	2022	4	2022
DCO-Cyber Analytics Full Operational Capability	4	2022	4	2022
DCO-Mission Planning POR Contract	1	2021	4	2025
DCO-Mission Planning Capability Drop 6	1	2021	2	2021
DCO-Mission Planning Capability Drop 7	2	2021	3	2021
DCO-Mission Planning Capability Drop 8	3	2021	4	2021
DCO-Mission Planning Capability Drop 9	1	2022	1	2022
DCO-Mission Planning Capability Drop 10	2	2022	2	2022
DCO-Mission Planning Capability Drop 11	3	2022	4	2022
DCO-Mission Planning-Full Operational Capability	4	2022	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army				Date: February 2020	
Appropriation/Budget Activity 2040 I 8		**R-1 Program Element (Number/Name)** PE 0608041A I *Defensive CYBER -* *Software Prototype Development*		**Project (Number/Name)** CD1 I *Defensive Cyber - Software Prototype* *Devel*	

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
DCO-Tools Suite v5.0	1	2021	2	2021
DCO-Tools Suite v6.0	3	2021	2	2022
DCO-User Activity Monitor POR Contract	1	2021	4	2025
DCO-User Activity Monitoring Capability Drop 3	1	2021	1	2021
DCO-User Activity Monitoring Capability Drop 4	3	2021	3	2021
DCO-User Activity Monitoring Capability-Full Operational Capability	4	2022	4	2022
DCO-Forensics and Malware POR Contract	1	2021	4	2025
DCO-Forensics and Malware Capability Drop 1	1	2021	3	2021
DCO-Forensics and Malware Capability Drop 2	2	2021	2	2022
DCO-Forensics and Malware Capability Drop 3	1	2023	1	2024
DCO-Forensics and Malware-Initial Operational Capability	2	2021	2	2021
DCO-Threat Emulation POR Contract	1	2021	4	2025
DCO-Threat Emulation Capability Drop 2	2	2021	2	2021
DCO-Threat Emulation Capability Drop 3	3	2021	4	2021
DCO-Threat Emulation Capability Drop 4	4	2021	1	2022
DCO-Threat Emulation-Initial Operational Capability	1	2022	1	2022
DCO-Threat Emulation Capability Drop 5	1	2022	2	2022
DCO-Threat Emulation Capability Drop 6	2	2022	3	2022
DCO-Threat Emulation Capability Drop 7	3	2022	4	2022
DCO-Threat Emulation-Full Operational Capability	4	2022	4	2022

Note

TDI full deployment is defined when programs have completed the development and testing of the last capability drop within the IT Box (reaching full functional values of the RDP) and has transferred the capability to the CPCE/TSI program to commence fielding.

DCO is capability owner and full operational capability is defined when programs have completed the development and testing of the last capability drop within the IT Box (reaching full functional values of the RDP).

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Army		**Date:** February 2020
Appropriation/Budget Activity 2040 *I* 8	**R-1 Program Element (Number/Name)** PE 0608041A *I Defensive CYBER -* *Software Prototype Development*	**Project (Number/Name)** CD1 *I Defensive Cyber - Software Prototype* *Devel*

Current DCO IT box ends in FY22. Army Capabilities Manager (ACM, formerly TRADOC Capability Manager (TCM)) is working a new DCO IS ICD to align with a new IT Box construct for FY23-27.