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**Department of Defense  
Fiscal Year (FY) 2022 Budget Estimates**

May 2021



**Army**

*Justification Book Volume 3c of 3*

***Research, Development, Test & Evaluation, Army***

**RDT&E – Volume III, Budget Activity 8**

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Army • Budget Estimates FY 2022 • RDT&E Program

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**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, \$12,799,645,000.00 to remain available for obligation until September 30, 2023.

The FY 2022 Overseas Contingency Operations accounted for in the base budget are as follows:

Direct War cost accounted for in the Base Budget \$67,710,000: Direct War costs are those combat or direct combat support costs that will not continue to be expended once combat operations end at major contingency locations.

Enduring costs accounted for in the Base budget: \$41,546,000: Enduring Requirements are enduring in theater and in CONUS costs that will likely remain after combat operations cease, and have previously been funded in OCO.

FY 2021 includes Division C, Title IX and Division J, Title IV of the Consolidated Appropriations Act, 2021 (P.L. 116-260).

FY 2020 includes Division A, Title IX and X of the Consolidated Appropriations Act, 2020 (P.L. 116-93), Division F, title IV and V from the Further Consolidated Appropriations Act, 2020 (P.L. 116-94) and the Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136).

**COST STATEMENT**

The following Justification Books were prepared at a cost of \$472,560: 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.

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**FY 2022 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 2021.
  
2. **Relationship of the FY 2022 Budget Submitted to Congress to the FY 2021 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:**

<u><i>Budget Activity</i></u>	<u><i>OSDPE / Project</i></u>	<u><i>Project Title</i></u>
01	0601104A / CI9	Strategic University Basic Research Alliance
02	0602141A / CJ1	Lethality Enabling University Applied Research
02	0602147A / AF1	Long Range Maneuverable Fires (LRMF) Technology
02	0602181A / CM7	Collaborative Convergence Applied Research
02	0602182A / CN4	Network Enabling University Applied Research
02	0602183A / CL5	Air Platform Enabling University Applied Research
02	0602184A / CK9	Advancing Concepts and Technology Forecasting Tech
02	0602184A / CN2	Intelligent Weapons Concepts and Technologies
02	0602184A / CN9	Soldier Enabling University Applied Research
02	0602184A / CO1	Soldier Power And Energy Concepts and Technologies
02	0602184A / CO2	Soldier-Intelligent Technology Research
02	0602386A / CP6	Biotechnology Demonstration and Evaluation
03	0603025A / CK8	Advanced Technology Development and Convergence
03	0603041A / CL9	Collab Battlefield Networked Leth Sys Adv Tech
03	0603041A / CM2	Collaborative Convergence Adv Tech Development
03	0603041A / CM8	Convergence Battlefield Integration

03	0603042A / CN3	Network Enabling University Adv Development
03	0603043A / CL4	Air Platform Enabling University Adv Development
03	0603044A / CN8	Soldier Enabled University Advanced Development
03	0603119A / CJ9	Ground Enabling University Adv Development
03	0603386A / CP7	Foundational Biotechnology Design and Development
03	0603462A / BH4	Ground Vehicle Holistic Defense Adv Tech
03	0603463A / AO3	Network C3I Advanced Technology
03	0603463A / AO6	Network C3I Advanced Technology
03	0603463A / AP6	Network C3I Advanced Technology
03	0603463A / AP8	Network C3I Advanced Technology
04	0604019A / BU9	IFPC High Energy Laser
04	0604019A / CO6	IFPC High Power Microwave (HPM)
04	0604115A / CE4	Emerging Technology Initiatives Development
04	0604403A / FM3	Future Interceptor
04	0604531A / CQ5	C-SUAS JOINT NEW CAPABILITIES DEVELOPMENT
04	0604531A / CQ6	C-SUAS JOINT ENABLING CAPABILITIES DEVELOPMENT
05	0303667A / CR1	Citizen Broadband Radio System
05	0304270A / CK3	TLS Echelon Above Brigade (EAB)
05	0604601A / S70	Personnel Recovery Support System (PRSS)
05	0604802A / CE3	Precision Munition (Sniper)
05	0604804A / VR7	Combat Service Support Systems
05	0604818A / EJ6	TACTICAL ENHANCEMENT
05	0605053A / BS9	Robotic Payloads
05	0605143A / BX5	Biometrics Enabling Capability (BEC)
05	0605531A / CQ7	C-SUAS JOINT NEW CAPABILITIES
05	0605531A / CQ8	C-SUAS JOINT ENABLING CAPABILITIES
07	0307665A / BI7	Biometrics Enabled Intelligence
07	0607131A / CP2	Precision Fire Technology Improvements

**Program Element/Project Restructures:**

<b><u>Budget Activity</u></b>	<b><u>Old OSDPE / Project: Title</u></b>	<b><u>New OSDPE / Project</u></b>
01	0601102A / AA1 AA2 AA6 AA7 AA8 AB1 AB2 AB4 AC6: Multiple	0601601A / CL3
01	0602785A / 790: Manpower/Personnel/Training Technology	0603040A / CL1
02	0602787A / MM8: Infectious Diseases and Applied Rsch Technology	0603002A / CJ3
02	0602787A / MN1: Applied Sensory Systems Trauma Technology	0602787A / MK4, MM4
02	0602141A / AH9: Advanced Warheads Technology	0602141A / CJ6
02	0602141A / AI1: Advanced Terrain Shaping Technology	0602141A / CF8
02	0602143A / BC3: Soldier Decision Making & Comms Performance Tech	0602184A / CO2
02	0602143A / BD6: Soldier Sys Interfaces/Integration- Sensor Tech	0602180A / CL7
02	0602144A / CA9: Predictive Maintenance	0602180A / CN7
02	0602145A / BF6: Crew Augmentation and Optimization Tech	0602144A / CG8
02	0602145A / BF8: Artificial Intelligence & Machine Learning Tech	0602180A / CL7
02	0602145A / BF8: Artificial Intelligence & Machine Learning Tech	0602183A / CL5
02	0602145A / BF9: Sensors for Autonomous Operations and Surv Tech	0602180A / CL2
02	0602145A / BG6: Advanced Concepts for Active Defense Technology	0602144A / CG7
02	0602145A / BH5: Platform Electrification and Mobility Tech	0602144A / CG6
02	0602145A / BH9: Protection for Autonomous Systems Tech	0603041A / CM8
02	0602145A / BI2: Sensor Protection Technology	0602144A / CG5
02	0602146A / AN7: COE - Every Receiver is a Sensor Technology	0602180A / CL2
02	0602146A / AO5: Tag Track and Locate Small Satellites Technology	0602146A / CK1, CG3
02	0602146A / AP4: CEMA Camouflage Technology	0602182A / CM9, CN5
02	0602146A / AQ9: Expeditionary Data to Decisions Technology	0602146A / CI3
02	0602146A / AV6: Airborne Engineering Support Technology	0603463A / CI7
02	0602148A / AI5: Next Gen Tactical UAS TD Technology	0602148A / CH2
02	0602148A / AJ4: Digital Vehicle Management and Control Technology	0602148A / CG9
02	0602148A / AK2: Aviation Survivability Technology	0602183A / CN1
02	0602148A / AK2: Aviation Survivability Technology	0602148A / CH3
02	0602148A / AK4: Multi-Role Small Guided Missile Technology	0602148A / CI5



02	0602148A / AK9: Adv Teaming for Tactical Aviation Operations Tech	0602183A / CL8
02	0602148A / AM4: Opt Energy Stg & Therm Mgmt for FVL Survivability	0602148A / CH4
02	0602150A / AC9: High Energy Laser Tactical Vehicle Demonstrator Te	0603466A / AD1
02	0602150A / AD2: High Energy Laser (HEL) Enabling and Support Techn	0602141A / CF7
02	0602150A / AD3: Maneuver Air Defense Technology	0602141A / CJ7
02	0602213A / CY8: Cyber Security App Research and Exper Partner Tech	0603463A / CI7
02	0602213A / CY8: Cyber Security App Research and Exper Partner Tech	0602146A / CI3
02	0603002A / MO9: Vaccines to Prevent Dengue Fever Advanced Tech	0603002A / CJ3
02	0603007A / 792: Personnel Performance & Training	0603040A / CL6
03	0603116A / AI3: Terminal Weapons Effects Against Structures and Critical Targets Tech	0603116A / CH5
03	0603118A / BC4: Soldier Decision Making&Comms Performance AdvTech	0603465A / AL9
03	0603463A / AM9: Protected SATCOM Advanced Technology	0603463A / CI7
03	0603463A / AM9: Protected SATCOM Advanced Technology	0602146A / AN3
03	0603463A / AO3: Stand-In Advanced RF Effects (STARE) Adv Tech	0603463A / AO7
03	0603463A / AO6: Tag Track and Locate Small Satellites Adv Tech	0603463A / CJ8
03	0603463A / AP6: C4ISR Integrated Demonstrations Advanced Tech	0603463A / AN4, AM9, AP9
03	0603463A / AP8: Comms/Horiz Int for Army Mod Priorities Adv Tech	0603041A / CL9, CL2, CM8
03	0603463A / AQ1: Spectrum Obfuscation Advanced Technology	0603463A / CI7
03	0603463A / AQ5: Sensor CE-Integrated Sensor Architecture Adv Tech	0603463A / CI7
03	0603463A / AQ8: High Tempo Data Driven Decision Tools Adv Tech	0603463A / CI7
03	0603463A / AU6: Automated Analytics for Operational Environment AT	0603463A / CF9
03	0603463A / AV2: LEO Advanced Technology	0603463A / CJ8
03	0603463A / BZ8: Aerial Tier Networking (High Altitude)	0602146A / AN3
03	0603465A / AJ1: Future UAS Engine Advanced Technology	0603465A / AI8
03	0603465A / AJ5: Digital Vehicle Management & Control Advanced Tech	0603465A / CH6
03	0603465A / AK3: Aviation Survivability Advanced Technology	0603465A / CH8, CG1
03	0603465A / AM5: Opt Energy Stg & Therm Mgmt for FVL Surv Adv Tech	0603465A / CH7
03	0603466A / AD6: Next Generation Fires Radar Advanced Technology	0602141A / CG4
04	0603327A / FG9: Air and Missile Defense (AMD) Electronic Warfare	0604741A / 126
04	0603619A / 606: Cntrmn/Barrier Adv Dev	0603619A / CE5

04	0603639A / BQ4: 155mm Artillery Propulsion XM654	0604802A / BQ3
04	0603639A / FG1: Cannon-Delivered Area Effects Munitions (C-DAEM)	0604802A / FG1
04	0603766A / 907: Tactical Electronic Surveillance System - Adv Dev	0603766A / BX9, CC5, BY9
04	0603774A / VT7: Soldier Maneuver Sensors - Adv Dev	0603774A / BQ5
04	0603801A / F12: Future Attack Reconnaissance Aircraft	0603801A / CK7
04	0603807A / 811: Mil HIV Vac&Drug Dev	0604807A / 849
04	0604017A / FD2: Soldier Robotics Systems	0605053A / BS9
04	0604117A / FI4: Maneuver - Short Range Air Defense (M-SHORAD)	0604117A / CR9, CS1
04	0604120A / ED5: Assured Positioning, Navigation and Timing (PNT)	1206120A / FJ8
04	0604120A / EH8: DISMOUNTED	1206120A / FJ9
04	0604120A / EH9: PSEUDOLITES	1206120A / FK1
04	0604120A / EJ2: MOUNTED	1206120A / FK2
04	0604120A / EJ3: ANTI-JAM ANTENNA	1206120A / FK3
04	0604121A / FD6: Synthetic Training Environment Refine & Prototype	0604121A / CR2, CR3, CR4, CR5, CR7
04	0604121A / SV1: Soldier/Squad Virtual Trainer	0604121A / CR4, CR6
04	0604182A / HX1: Long-Range Hypersonic Weapon	0605232A / HX2
04	0604319A / DU3: IFPC2	0605052A / EY7
04	0604710A / L67: Soldier Night Vision Devices	0604710A / BQ6
04	0604807A / 812: Mil HIV Vac&Drug Dev	0604807A / 849
04	0604808A / 016: Close Combat Capabilities ENG DEV	0604808A / CS2, CS3
04	0604823A / L86: LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)	0607148A / BY8
04	0604823A / L88: Enhanced AN/TPQ 36	0607148A / BY8
05	0304270A / EW5: Electronic Warfare Development - MIP	0607313A / CE2
05	0304270A / EW6: ARAT-TSS - MIP	0304270A / CR8
05	0604798A / FG7: Emerging Technology Initiatives	0605054A / FI3
05	0605013A / 738: AcqBiz	0605013A / FL9
05	0605013A / FL9: Army Accessioning IT Development	0605233A / CP8
05	0605036A / EQ5: Combating Weapons of Mass Destruction (CWMD)	0605036A / CS6
05	0605041A / EV5: Defensive CYBER Operations	0608041A / CD1
05	0605053A / FB8: Soldier Borne Sensor (SBS)	0604827A / FK4

05	0605766A / DX9: National Integration To Tactical Systems(MIP)	0605766A / BV3
06	0604256A / 976: Army Threat Sim (ATS)	0604759A / FF1
06	0605898A / XW7: Command HQ - ARI	0605801A / M15
07	0303140A / DV4: Key Management Infrastructure (KMI)	0605144A / BY6
07	0305208A / D07: DCGS-A Common Modules (MIP)	0605148A / BY5
07	0305208A / D07: DCGS-A Common Modules (MIP)	0605224A / CK4
07	0305208A / D07: DCGS-A Common Modules (MIP)	0604037A / BY4
07	0205402A / EF2: Integrated Base Defense	0604785A / DS4
07	0607134A / ES1: Long Range Precision Fires (LRPF)	0605231A / CO3

**Program Terminations (including transfers to Procurement and Sustainment):**

<b><i>Budget Activity</i></b>	<b><i>OSDPE / Project</i></b>	<b><i>Project Title</i></b>
02	0602143A / BB7	Soldier Lethality Technology / Exoskeleton: Technology for Man-Machine Interface
02	0602145A / BF1	Next Generation Combat Vehicle Technology / Autonomous Ground Resupply Tech
02	0602146A / AM6	Network C3I Technology / Modular RF Communications Technology
02	0602146A / AP7	Network C3I Technology / Comms/Horiz Int for Army Mod Priorities Tech
02	0602146A / AQ7	Network C3I Technology / High Tempo Data Driven Decision Tools Technology
02	0602146A / AT2	Network C3I Technology / Subterranean Detection and Monitoring Technology
02	0602146A / AU3	Network C3I Technology / Geospatially Enabled Operational Design Technology
02	0602146A / AW3	Network C3I Technology / DoD PNT M&S Collaborative Initiative (CI) Technolo
02	0602146A / BZ6	Network C3I Technology / Narrowband SATCOM Technology
02	0602150A / AC9	Air and Missile Defense Technology / High Energy Laser Tactical Vehicle Demonstrator Te
02	0602150A / AE4	Air and Missile Defense Technology / Collaborative ISR Sensors Technology
03	0603118A / BB6	Soldier Lethality Advanced Technology / Physical Augmentation: Adv Tech for Field Demo
03	0603462A / BF2	Next Generation Combat Vehicle Advanced Technology / Autonomous Ground Resupply (AGR) Adv Tech
03	0603462A / BG5	Next Generation Combat Vehicle Advanced Technology / Extended Line of Sight (ELOS) Advanced Technology
03	0603462A / BH1	Next Generation Combat Vehicle Advanced Technology / Survivability Systems Controls Advanced Technology

03	0603462A / BK6	Next Generation Combat Vehicle Advanced Technology / Adv Direct InDirect Armament Sys (ADIDAS) Adv Tech
03	0603463A / AN6	Network C3I Advanced Technology / Prot SATCOM-WB Global SATCOM Inter Canc Adv Tech
03	0603463A / AW4	Network C3I Advanced Technology / DoD PNT M&S Collaborative Initiative (CI) Adv Tech
03	0603464A / AE9	Long Range Precision Fires Advanced Technology / Low-Cost Tact Ext Range Missile (LC-TERM) Adv Tech
03	0603466A / AE1	Air and Missile Defense Advanced Technology / Close Combat High Energy Laser Advanced Technology
04	0603639A / 694	Tank and Medium Caliber Ammunition / Medium Caliber Ammunition
04	0603747A / C08	Soldier Support and Survivability / Rapid Equipping Force
04	0603804A / G11	Logistics and Engineer Equipment - Adv Dev / Adv Elec Energy Con Ad
04	0603807A / VS7	Medical Systems - Adv Dev / MEDEVAC Mission Equipment Package (MEP) - Adv Dev
04	0604021A / AW7	Electronic Warfare Technology Maturation (MIP) / Electronic Warfare Technology Maturation (MIP)
04	0604115A / AX4	Technology Maturation Initiatives / Computational Prototyping Environment (CPE)
04	0604115A / AX6	Technology Maturation Initiatives / Active Protection Systems Integration
04	0604115A / AX7	Technology Maturation Initiatives / Multi-Mission High Energy Laser (MMHEL) Sys Demo
04	0604115A / AY1	Technology Maturation Initiatives / MUM-T Platform Enabler
04	0604115A / AY3	Technology Maturation Initiatives / Strategic Long Range Cannon
05	0604622A / VR5	Family of Heavy Tactical Vehicles / TWV Protection Kits
05	0604741A / 149	Air Defense Command, Con trol and Intelligence - Eng Dev / Counter-Rockets, Artillery & Mortar
05	0604768A / 688	Brilliant Anti-Armor Submunition (BAT) / ATACMS BLK II
05	0604780A / 582	Combined Arms Tactical Trainer (CATT) Core / Synthetic Envir Core
05	0604798A / DY5	Brigade Analysis, Integration and Evaluation / Production/Field Coordination for Capability Sets
05	0604802A / 613	Weapons and Munitions - Eng Dev / MORTAR SYSTEMS
05	0604802A / EU5	Weapons and Munitions - Eng Dev / .50 Caliber All-Purpose Tactical cartridge (APTC)
05	0604802A / XT2	Weapons and Munitions - Eng Dev / 40mm Door Breach
05	0604804A / FG4	Logistics and Engineer Equipment - Eng Dev / Ultra-Lightweight Camouflage Net System (ULCANS)
05	0604808A / 415	Landmine Warfare/Barrier - Eng Dev / Mine Neutral/Detection
05	0604854A / HB6	Artillery Systems - EMD / Mobile 155MM Howitzer
05	0605033A / EQ3	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E) / Grnd-Based Opnl

		Surv Sys -Exped (GBOSS-E)
05	0605053A / FB4	Ground Robotics / Common Robotic Systems
07	0203744A / EB6	Aircraft Modifications/Product Improvement Programs / MQ-1C Gray Eagle MODS
07	0305204A / 123	Tactical Unmanned Aerial Vehicles / Joint Technology Center System Integration

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.



## UNCLASSIFIED

Department of Defense  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

05 May 2021

<u>Appropriation</u>	<u>FY 2020 Actual*</u>	<u>FY 2021 Enacted**</u>	<u>FY 2022 Request</u>
Research, Development, Test & Eval, Army	12,842,958	14,144,856	12,799,645
Total Research, Development, Test & Evaluation	12,842,958	14,144,856	12,799,645
<u>Other RDT&amp;E Budget Activities Not Included in the Research, Development, Test and Evaluation Title</u>			
Chem Agents & Munitions Destruction	890,830	942,493	1,001,231
Total Not in Research, Development, Test & Evaluation Title	890,830	942,493	1,001,231

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Department of Defense  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

05 May 2021

Summary Recap of Budget Activities -----	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
Basic Research	557,265	552,521	473,475
Applied Research	1,227,661	1,518,770	914,288
Advanced Technology Development	1,520,145	1,940,015	1,297,437
Advanced Component Development & Prototypes	2,895,592	3,577,387	3,806,330
System Development & Demonstration	3,072,662	2,948,445	3,392,358
Management Support	1,759,840	1,834,218	1,416,698
Operational Systems Development	1,809,793	1,716,794	1,380,248
Software and Digital Technology Pilot Programs		56,706	118,811
Total Research, Development, Test & Evaluation	12,842,958	14,144,856	12,799,645
 Summary Recap of FYDP Programs -----			
General Purpose Forces	733,243	589,525	542,571
Intelligence and Communications	287,081	362,184	280,473
Research and Development	11,434,683	13,058,379	11,911,888
Central Supply and Maintenance	105,885	130,785	61,720
Administration and Associated Activities	61		
Space	274,732		
Classified Programs	7,273	3,983	2,993
Total Research, Development, Test & Evaluation	12,842,958	14,144,856	12,799,645



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Department of Defense  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

05 May 2021

	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
<u>Summary Recap of Non-RDT&amp;E Title FYDP Programs</u>			
Central Supply and Maintenance	890,830	942,493	1,001,231
Total Research, Development, Test & Evaluation	890,830	942,493	1,001,231

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Department of the Army  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

05 May 2021

<u>Summary Recap of Budget Activities</u>	<u>FY 2020 Actual*</u>	<u>FY 2021 Enacted**</u>	<u>FY 2022 Request</u>
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 <u>Summary Recap of FYDP Programs</u>			
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Research and Development	11,434,683	13,058,379	11,911,888
Central Supply and Maintenance	105,885	130,785	61,720
Administration and Associated Activities	61		
Space	274,732		
Classified Programs	7,273	3,983	2,993
Total Research, Development, Test & Evaluation	12,842,958	14,144,856	12,799,645

R-122BAS: FY 2022 President's Budget (Total Base Published Version), as of May 5, 2021 at 15:01:27

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Department of the Army  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

05 May 2021

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

Line No	Element Number	Program Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se
1	0601102A	Defense Research Sciences	01	343,481	344,031	297,241	U
2	0601103A	University Research Initiatives	01	85,148	84,697	66,981	U
3	0601104A	University and Industry Research Centers	01	123,654	118,716	94,003	U
4	0601121A	Cyber Collaborative Research Alliance	01	4,982	5,077	5,067	U
5	0601601A	Artificial Intelligence and Machine Learning Basic Research	01			10,183	U
		Basic Research		557,265	552,521	473,475	
6	0602115A	Biomedical Technology	02		11,403	11,925	U
7	0602134A	Counter Improvised-Threat Advanced Studies	02		1,927	1,976	U
8	0602141A	Lethality Technology	02	68,852	117,484	64,126	U
9	0602142A	Army Applied Research	02	30,733	30,757	28,654	U
10	0602143A	Soldier Lethality Technology	02	141,154	201,750	105,168	U
11	0602144A	Ground Technology	02	143,172	158,158	56,400	U
12	0602145A	Next Generation Combat Vehicle Technology	02	255,041	258,351	172,166	U
13	0602146A	Network C3I Technology	02	133,804	202,257	84,606	U
14	0602147A	Long Range Precision Fires Technology	02	117,395	119,007	64,285	U
15	0602148A	Future Verticle Lift Technology	02	94,888	169,536	91,411	U
16	0602150A	Air and Missile Defense Technology	02	93,937	107,584	19,316	U
17	0602180A	Artificial Intelligence and Machine Learning Technologies	02			15,034	U
18	0602181A	All Domain Convergence Applied Research	02			25,967	U
19	0602182A	C3I Applied Research	02			12,406	U
20	0602183A	Air Platform Applied Research	02			6,597	U

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21	0602184A	Soldier Applied Research	02			11,064	U
22	0602213A	C3I Applied Cyber	02	17,351	18,816	12,123	U
23	0602386A	Biotechnology for Materials - Applied Research	02			20,643	U
24	0602785A	Manpower/Personnel/Training Technology	02	20,406	20,399	18,701	U
25	0602787A	Medical Technology	02	110,928	101,341	91,720	U
		Applied Research		1,227,661	1,518,770	914,288	
26	0603002A	Medical Advanced Technology	03	82,256	94,669	43,804	U
27	0603007A	Manpower, Personnel and Training Advanced Technology	03	10,225	11,344	14,273	U
28	0603025A	Army Agile Innovation and Demonstration	03			22,231	U
29	0603040A	Artificial Intelligence and Machine Learning Advanced Technologies	03			909	U
30	0603041A	All Domain Convergence Advanced Technology	03			17,743	U
31	0603042A	C3I Advanced Technology	03			3,151	U
32	0603043A	Air Platform Advanced Technology	03			754	U
33	0603044A	Soldier Advanced Technology	03			890	U
34	0603115A	Medical Development	03		26,711	26,521	U
35	0603116A	Lethality Advanced Technology	03			8,066	U
36	0603117A	Army Advanced Technology Development	03	66,424	62,663	76,815	U
37	0603118A	Soldier Lethality Advanced Technology	03	131,119	151,370	107,966	U
38	0603119A	Ground Advanced Technology	03	136,544	196,055	23,403	U
39	0603134A	Counter Improvised-Threat Simulation	03		24,087	24,747	U
40	0603386A	Biotechnology for Materials - Advanced Research	03			53,736	U

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41	0603457A	C3I Cyber Advanced Development	03	25,492	43,357	31,426	U
42	0603461A	High Performance Computing Modernization Program	03	217,389	221,161	189,123	U
43	0603462A	Next Generation Combat Vehicle Advanced Technology	03	255,386	302,209	164,951	U
44	0603463A	Network C3I Advanced Technology	03	138,937	216,520	155,867	U
45	0603464A	Long Range Precision Fires Advanced Technology	03	196,393	177,142	93,909	U
46	0603465A	Future Vertical Lift Advanced Technology	03	180,163	220,334	179,677	U
47	0603466A	Air and Missile Defense Advanced Technology	03	79,817	175,703	48,826	U
48	0603920A	Humanitarian Demining	03		16,690	8,649	U
		Advanced Technology Development		1,520,145	1,940,015	1,297,437	
49	0603305A	Army Missile Defense Systems Integration	04	59,318	140,195	11,702	U
50	0603308A	Army Space Systems Integration	04		25,584	18,755	U
51	0603327A	Air and Missile Defense Systems Engineering	04	52,672	47,098		U
52	0603619A	Landmine Warfare and Barrier - Adv Dev	04	79,504	56,067	50,314	U
53	0603639A	Tank and Medium Caliber Ammunition	04	72,456	100,367	79,873	U
54	0603645A	Armored System Modernization - Adv Dev	04	138,300	138,685	170,590	U
55	0603747A	Soldier Support and Survivability	04	9,246	5,712	2,897	U
56	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	37,490	182,400	113,365	U
57	0603774A	Night Vision Systems Advanced Development	04	192,530	15,429	18,000	U
58	0603779A	Environmental Quality Technology - Dem/Val	04	19,089	20,906	11,921	U
59	0603790A	NATO Research and Development	04	5,184	4,589	3,777	U
60	0603801A	Aviation - Adv Dev	04	488,397	694,296	1,125,641	U

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61	0603804A	Logistics and Engineer Equipment - Adv Dev	04	7,081	8,587	7,055	U
62	0603807A	Medical Systems - Adv Dev	04	36,307	33,085	22,071	U
63	0603827A	Soldier Systems - Advanced Development	04	25,204	23,184	17,459	U
64	0604017A	Robotics Development	04	80,909	95,367	87,198	U
65	0604019A	Expanded Mission Area Missile (EMAM)	04			50,674	U
66	0604021A	Electronic Warfare Technology Maturation (MIP)	04	23,043	15,034		U
67	0604035A	Low Earth Orbit (LEO) Satellite Capability	04		21,850	19,638	U
68	0604036A	Multi-Domain Sensing System (MDSS) Adv Dev	04			50,548	U
69	0604037A	Tactical Intel Targeting Access Node (TITAN) Adv Dev	04			28,347	U
70	0604100A	Analysis Of Alternatives	04	9,811	9,714	10,091	U
71	0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04		1,328	926	U
72	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	40,745	57,083	69,697	U
73	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	364,154	308,805	327,690	U
74	0604115A	Technology Maturation Initiatives	04	171,058	141,109	270,124	U
75	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	41,690	4,813	39,376	U
76	0604119A	Army Advanced Component Development & Prototyping	04	117,335	172,990	189,483	U
77	0604120A	Assured Positioning, Navigation and Timing (PNT)	04		115,688	96,679	U
78	0604121A	Synthetic Training Environment Refinement & Prototyping	04	99,357	112,093	194,195	U
79	0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04		13,326	13,379	U
80	0604182A	Hypersonics	04	394,619	832,166	300,928	U
81	0604403A	Future Interceptor	04	1,918		7,895	U

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82	0604531A	Counter - Small Unmanned Aircraft Systems Advanced Development	04			19,148	U
83	0604541A	Unified Network Transport	04	28,478	39,192	35,409	U
84	0604644A	Mobile Medium Range Missile	04	4,794	88,100	286,457	U
85	0604785A	Integrated Base Defense (Budget Activity 4)	04	2,000	2,020	2,040	U
86	0305251A	Cyberspace Operations Forces and Force Support	04	58,611	50,525	52,988	U
87	1206120A	Assured Positioning, Navigation and Timing (PNT)	04	133,307			U
88	1206308A	Army Space Systems Integration	04	100,985			U
		Advanced Component Development & Prototypes		2,895,592	3,577,387	3,806,330	
89	0604201A	Aircraft Avionics	05	8,069	7,011	6,654	U
90	0604270A	Electronic Warfare Development	05	57,090	56,624	30,840	U
91	0604601A	Infantry Support Weapons	05	86,154	88,552	67,873	U
92	0604604A	Medium Tactical Vehicles	05		8,213	11,374	U
93	0604611A	JAVELIN	05	14,377	5,983	7,094	U
94	0604622A	Family of Heavy Tactical Vehicles	05	12,085	22,254	31,602	U
95	0604633A	Air Traffic Control	05	5,543	3,383	4,405	U
96	0604642A	Light Tactical Wheeled Vehicles	05	2,843	4,193	2,055	U
97	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	273,433	123,992	137,256	U
98	0604710A	Night Vision Systems - Eng Dev	05	135,283	54,234	62,690	U
99	0604713A	Combat Feeding, Clothing, and Equipment	05	7,295	2,734	1,658	U
100	0604715A	Non-System Training Devices - Eng Dev	05	29,785	27,013	26,540	U
101	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	70,279	62,058	59,518	U

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102	0604742A	Constructive Simulation Systems Development	05	11,158	9,779	22,331	U
103	0604746A	Automatic Test Equipment Development	05	10,466	5,375	8,807	U
104	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	7,480	7,605	7,453	U
105	0604768A	Brilliant Anti-Armor Submunition (BAT)	05	19,177	24,064		U
106	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	8,861	3,438		U
107	0604798A	Brigade Analysis, Integration and Evaluation	05	29,852	18,737	21,534	U
108	0604802A	Weapons and Munitions - Eng Dev	05	182,119	268,858	309,778	U
109	0604804A	Logistics and Engineer Equipment - Eng Dev	05	105,668	53,676	59,261	U
110	0604805A	Command, Control, Communications Systems - Eng Dev	05	12,077	10,674	20,121	U
111	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	70,489	51,285	44,424	U
112	0604808A	Landmine Warfare/Barrier - Eng Dev	05	33,881	9,239	14,137	U
113	0604818A	Army Tactical Command & Control Hardware & Software	05	124,749	128,676	162,704	U
114	0604820A	Radar Development	05	91,782	105,271	127,919	U
115	0604822A	General Fund Enterprise Business System (GFEBs)	05	41,119	15,428	17,623	U
116	0604823A	Firefinder	05	16,583	18,278		U
117	0604827A	Soldier Systems - Warrior Dem/Val	05	4,606	6,296	6,454	U
118	0604852A	Suite of Survivability Enhancement Systems - EMD	05	81,899	62,012	106,354	U
119	0604854A	Artillery Systems - EMD	05	20,290	36,187		U
120	0605013A	Information Technology Development	05	89,541	126,498	122,168	U
121	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	97,873	111,078	76,936	U
122	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	80,381	76,140	35,560	U

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123	0605029A	Integrated Ground Security Surveillance Response Capability (IGSSR-C)	05	6,423			U
124	0605030A	Joint Tactical Network Center (JTNC)	05	15,228	15,671	16,364	U
125	0605031A	Joint Tactical Network (JTN)	05	39,130	30,540	28,954	U
126	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	3,689	5,758		U
127	0605034A	Tactical Security System (TSS)	05	7,343			U
128	0605035A	Common Infrared Countermeasures (CIRCM)	05	22,226	29,770	16,630	U
129	0605036A	Combating Weapons of Mass Destruction (CWMD)	05	9,589			U
130	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	5,805	4,669	7,618	U
131	0605041A	Defensive CYBER Tool Development	05	50,662	28,544	18,892	U
132	0605042A	Tactical Network Radio Systems (Low-Tier)	05	27,236	20,511	28,849	U
133	0605047A	Contract Writing System	05	16,379	22,025	22,960	U
134	0605049A	Missile Warning System Modernization (MWSM)	05	1,475			U
135	0605051A	Aircraft Survivability Development	05	130,211	99,208	65,603	U
136	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	186,369	153,362	233,512	U
137	0605053A	Ground Robotics	05	24,747	12,010	18,241	U
138	0605054A	Emerging Technology Initiatives	05	36,146	294,366	254,945	U
139	0605143A	Biometrics Enabling Capability (BEC)	05			4,326	U
140	0605144A	Next Generation Load Device - Medium	05			15,616	U
141	0605145A	Medical Products and Support Systems Development	05		919	962	U
142	0605148A	Tactical Intel Targeting Access Node (TITAN) EMD	05			54,972	U

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143	0605203A	Army System Development & Demonstration	05	184,410	150,201	122,175	U
144	0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05		5,780	2,275	U
145	0605224A	Multi-Domain Intelligence	05			9,313	U
146	0605225A	SIO Capability Development	05			22,713	U
147	0605231A	Precision Strike Missile (PrSM)	05			188,452	U
148	0605232A	Hypersonics EMD	05			111,473	U
149	0605233A	Accessions Information Environment (AIE)	05			18,790	U
150	0605450A	Joint Air-to-Ground Missile (JAGM)	05	6,314	7,566	2,134	U
151	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	211,634	206,850	157,873	U
152	0605531A	Counter - Small Unmanned Aircraft Systems Sys Dev & Demonstration	05			33,386	U
153	0605625A	Manned Ground Vehicle	05	197,304	171,890	225,106	U
154	0605766A	National Capabilities Integration (MIP)	05	7,835	7,670	14,454	U
155	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	7,119	1,678	2,564	U
156	0605830A	Aviation Ground Support Equipment	05	1,596	1,413	1,201	U
157	0303032A	TROJAN - RH12	05	3,936	3,451	3,362	U
158	0303267A	Auctioned Spectrum Relocation Fund	05	7,650			U
159	0303467A	SENSR Spectrum Pipeline SRF	05	251			U
160	0303567A	Non-SENSR Spectrum Pipeline SRF	05	1,236			U
161	0304270A	Electronic Warfare Development	05	18,432	59,755	75,520	U
		System Development & Demonstration		3,072,662	2,948,445	3,392,358	
162	0604256A	Threat Simulator Development	06	41,566	41,486	18,439	U

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163	0604258A	Target Systems Development	06	27,984	35,279	17,404	U
164	0604759A	Major T&E Investment	06	140,946	119,231	68,139	U
165	0605103A	Rand Arroyo Center	06	12,573	12,989	33,126	U
166	0605301A	Army Kwajalein Atoll	06	230,051	221,965	240,877	U
167	0605326A	Concepts Experimentation Program	06	35,403	50,394	79,710	U
168	0605502A	Small Business Innovative Research	06	392,999	369,715		U
169	0605601A	Army Test Ranges and Facilities	06	356,231	390,351	354,227	U
170	0605602A	Army Technical Test Instrumentation and Targets	06	60,170	81,829	49,253	U
171	0605604A	Survivability/Lethality Analysis	06	33,632	36,001	36,389	U
172	0605606A	Aircraft Certification	06	3,319	2,736	2,489	U
173	0605702A	Meteorological Support to RDT&E Activities	06	6,094	6,360	6,689	U
174	0605706A	Materiel Systems Analysis	06	21,233	21,830	21,558	U
175	0605709A	Exploitation of Foreign Items	06	11,168	8,936	13,631	U
176	0605712A	Support of Operational Testing	06	52,280	54,116	55,122	U
177	0605716A	Army Evaluation Center	06	60,474	56,827	65,854	U
178	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,423	2,478	2,633	U
179	0605801A	Programwide Activities	06	56,800	84,510	96,589	U
180	0605803A	Technical Information Activities	06	30,434	25,487	26,808	U
181	0605805A	Munitions Standardization, Effectiveness and Safety	06	52,401	55,648	43,042	U
182	0605857A	Environmental Quality Technology Mgmt Support	06	4,489	1,715	1,789	U
183	0605898A	Army Direct Report Headquarters - R&D - MHA	06	53,320	54,564	52,108	U

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184	0606001A	Military Ground-Based CREW Technology	06	2,053			U
185	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	64,311	68,911	80,952	U
186	0606003A	CounterIntel and Human Intel Modernization	06	2,925	5,200	5,363	U
187	0606105A	Medical Program-Wide Activities	06		19,164	39,041	U
188	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	4,500	6,496	5,466	U
189	0909999A	Financing for Cancelled Account Adjustments	06	61			U
		Management Support		1,759,840	1,834,218	1,416,698	
190	0603778A	MLRS Product Improvement Program	07	14,014	9,786	12,314	U
191	0605024A	Anti-Tamper Technology Support	07	8,141	8,436	8,868	U
192	0607131A	Weapons and Munitions Product Improvement Programs	07	14,222	19,666	22,828	U
193	0607134A	Long Range Precision Fires (LRPF)	07	149,455	100,146		U
194	0607136A	Blackhawk Product Improvement Program	07	22,502	8,300	4,773	U
195	0607137A	Chinook Product Improvement Program	07	164,820	49,409	52,372	U
196	0607139A	Improved Turbine Engine Program	07	197,941	232,159	275,024	U
197	0607142A	Aviation Rocket System Product Improvement and Development	07	1,847	13,421	12,417	U
198	0607143A	Unmanned Aircraft System Universal Products	07	17,386	19,460	4,594	U
199	0607145A	Apache Future Development	07	5,224	52,502	10,067	U
200	0607148A	AN/TPQ-53 Counterfire Target Acquisition Radar System	07			56,681	U
201	0607150A	Intel Cyber Development	07		14,652	3,611	U
202	0607312A	Army Operational Systems Development	07	45,026	35,851	28,029	U
203	0607313A	Electronic Warfare Development	07			5,673	U

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204	0607665A	Family of Biometrics	07	1,576	1,276	1,178	U
205	0607865A	Patriot Product Improvement	07	83,833	178,984	125,932	U
206	0203728A	Joint Automated Deep Operation Coordination System (JADOCs)	07	45,447	43,060	25,547	U
207	0203735A	Combat Vehicle Improvement Programs	07	266,197	213,728	211,523	U
208	0203743A	155mm Self-Propelled Howitzer Improvements	07	191,076	217,959	213,281	U
209	0203744A	Aircraft Modifications/Product Improvement Programs	07	8,896	11,261		U
210	0203752A	Aircraft Engine Component Improvement Program	07	138	80	132	U
211	0203758A	Digitization	07	4,043	4,351	3,936	U
212	0203801A	Missile/Air Defense Product Improvement Program	07	1,235	1,241	127	U
213	0203802A	Other Missile Product Improvement Programs	07		15,268	10,265	U
214	0205412A	Environmental Quality Technology - Operational System Dev	07	10,000	250	262	U
215	0205456A	Lower Tier Air and Missile Defense (AMD) System	07	93,743		182	U
216	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	112,468	72,817	63,937	U
217	0208053A	Joint Tactical Ground System	07		9,510	13,379	U
219	0303028A	Security and Intelligence Activities	07	26,674	23,367	24,531	U
220	0303140A	Information Systems Security Program	07	25,710	28,270	15,720	U
221	0303141A	Global Combat Support System	07	57,604	70,652	52,739	U
222	0303142A	SATCOM Ground Environment (SPACE)	07		18,002	15,247	U
223	0303150A	WWMCCS/Global Command and Control System	07	1,988			U
226	0305179A	Integrated Broadcast Service (IBS)	07	459	382	5,430	U
227	0305204A	Tactical Unmanned Aerial Vehicles	07	22,147	38,151	8,410	U

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 Exhibit R-1 FY 2022 President's Budget  
 Total Obligational Authority  
 (Dollars in Thousands)

05 May 2021

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

Line No	Element Number	Program Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
228	0305206A	Airborne Reconnaissance Systems	07	13,177	28,858	24,460	U
229	0305208A	Distributed Common Ground/Surface Systems	07	28,821	40,771		U
230	0305219A	MQ-1C Gray Eagle UAS	07	5,000			U
231	0305232A	RQ-11 UAV	07	3,218			U
232	0305233A	RQ-7 UAV	07	7,817			U
233	0307665A	Biometrics Enabled Intelligence	07	4,350		2,066	U
234	0708045A	End Item Industrial Preparedness Activities	07	105,885	130,785	61,720	U
235	1203142A	SATCOM Ground Environment (SPACE)	07	32,764			U
236	1208053A	Joint Tactical Ground System	07	7,676			U
9999	9999999999	Classified Programs		7,273	3,983	2,993	U
		Operational Systems Development		1,809,793	1,716,794	1,380,248	
237	0608041A	Defensive CYBER - Software Prototype Development	08		56,706	118,811	U
		Software and Digital Technology Pilot Programs			56,706	118,811	
Total Research, Development, Test & Eval, Army				12,842,958	14,144,856	12,799,645	

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Department of the Army  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Non RDT&E Title  
 (Dollars in Thousands)

05 May 2021

<u>Summary Recap of Budget Activities</u>	<u>FY 2020 Actual*</u>	<u>FY 2021 Enacted**</u>	<u>FY 2022 Request</u>
Research, Development, Test, And Evaluation	890,830	942,493	1,001,231
Total Research, Development, Test & Evaluation	890,830	942,493	1,001,231
<u>Summary Recap of Non-RDT&amp;E Title FYDP Programs</u>			
Central Supply and Maintenance	890,830	942,493	1,001,231
Total Research, Development, Test & Evaluation	890,830	942,493	1,001,231

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Department of the Army  
 FY 2022 President's Budget  
 Exhibit R-1 FY 2022 President's Budget  
 Non RDT&E Title  
 (Dollars in Thousands)

05 May 2021

Appropriation: 0390D Chem Agents & Munitions Destruction

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	S e c
1	0708081D	Chemical Materials Agency	02	6,500	6,494	6,220	U
2	0708083D	Assembled Chemical Weapons Alternatives	02	884,330	935,999	995,011	U
		Research, Development, Test, And Evaluation		890,830	942,493	1,001,231	
Total Chem Agents & Munitions Destruction				890,830	942,493	1,001,231	



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Army • Budget Estimates FY 2022 • RDT&E Program

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

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

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<b>Line #</b>	<b>Budget Activity</b>	<b>Program Element Number</b>	<b>Program Element Title</b>	<b>Page</b>
237	08	0608041A	Defensive CYBER - Software Prototype Development.....	Volume 3c - 1

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Army • Budget Estimates FY 2022 • RDT&E Program

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

<b>Program Element Title</b>	<b>Program Element Number</b>	<b>Line #</b>	<b>BA</b>	<b>Page</b>
Defensive CYBER - Software Prototype Development	0608041A	237	08.....	Volume 3c - 1

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 8: Software and Digital Technology Pilot Programs</i>	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	-	56.706	118.811	-	118.811	-	-	-	-	-	-
CD1: <i>Defensive Cyber - Software Prototype Devel</i>	-	-	56.706	118.811	-	118.811	-	-	-	-	-	-

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

Defensive Cyber Operations (DCO) is the only Army program selected for the BA8 Software Pilot Program (PE 0608041A) starting in Fiscal Year (FY) 2021. The program realigned \$90.340 million FY 2022 Research, Development, Test, and Evaluation (RDTE) from PE 0605041A EV5 and \$28.471 million FY 2022 Other Procurement Army (OPA) from PE 0128B63000 to BA8 Software Pilot Program PE 0608041A CD1.

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.

Defensive Cyber Operations (DCO) and Tactical DCO Infrastructure (TDI) support the Army Network Modernization Strategy Line of Effort (LOE) 1, Key Enabler for Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

**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)
- \* DCO - DCO Development Environment (DCODE) - (PEO EIS)
- \* DCO - Army Cyber Command (ARCYBER) Rapid Cyber Prototyping

- 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.

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**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 8: Software and Digital Technology Pilot Programs</i>	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>
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- 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; while supporting Multi-Domain operations. ARCYBER identifies potential development and prototyping efforts via Cyber Needs Forms (CNFs) based on operational feedback, changes in the operational information environment and/or trends of adversarial activity; which drive CONOP and TTP modifications. These are separate and distinct from DCO programmed efforts already funded or budgeted for by PM DCO and are used to rapidly address a network threat/vulnerability.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	0.000	46.445	115.064	-	115.064
Current President's Budget	0.000	56.706	118.811	-	118.811
Total Adjustments	0.000	10.261	3.747	-	3.747
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.739			
• Congressional Rescissions	-	-			
• Congressional Adds	-	12.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	3.747	-	3.747

**Change Summary Explanation**

FY 2021 Funding in the amount of \$10.261 million increased to the Defensive Cyber program, cited from \$12.000 million transferred from FY 2021 OPA PE 0128B63000 to BA8 Software Pilot Program PE 0608041A CD1, and \$1.739 million decrement due to Tool Suite delays.

FY 2022 Funding in the amount of \$3.747 million increased to the Defensive Cyber program, cited from \$4.779 million transferred from FY 2022 RDTE PE 0605041A EV5, and \$1.032 million decrement due to Army's reprioritization.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 8					<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>				<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
CD1: <i>Defensive Cyber - Software Prototype Devel</i>	-	-	56.706	118.811	-	118.811	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Defensive Cyber Operations (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.

Defensive Cyber Operations (DCO) and Tactical DCO Infrastructure (TDI) support the Army Network Modernization Strategy Line of Effort (LOE) 1, Key Enabler for Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

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)
- \* DCO - DCO Development Environment (DCODE) - (PEO EIS)
- \* DCO - Army Cyber Command (ARCYBER) Rapid Cyber Prototyping

- 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: deter, destroy, and defeat enemy offensive cyberspace operations; gain time; economy of force; control key terrain; protect tasked critical assets and infrastructure; and

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>
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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; while supporting Multi-Domain operations. ARCYBER identifies potential development and prototyping efforts via Cyber Needs Forms (CNFs) based on operational feedback, changes in the operational information environment and/or trends of adversarial activity; which drive CONOP and Tactics Techniques and Procedures (TTP) modifications. These are separate and distinct from DCO programmed efforts already funded or budgeted for by PM DCO and are used to rapidly address a network threat/vulnerability.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Defensive Cyber Operations (DCO) - Tactical DCO Infrastructure (TDI) (PEO C3T)</p> <p><b>Description:</b> 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.</p> <p><b>FY 2021 Plans:</b> FY 2021 RDTE Plans: \$5.000M 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.</p> <p><b>FY 2022 Plans:</b> FY 2022 RDTE Plans: \$5.545M FY 2022 funding supports development engineering, integration, testing, training development and program management to complete the last capability within the current IT box, CD3. CD3 will integrate the enhanced DCO tool suite that will enable broader data collection and data aggregation (including existing logs from other PoRs), and the ability for WiFi and 4G connection monitoring in support of TDI Full Deployment 4QTR FY 2022. PEO C3T will execute these funds.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding increase will provide additional engineering and program management to support completion/Full Deployment of the current IT Box (which plans to be renewed).</p>	-	5.000	5.545
<p><b>Title:</b> Defensive Cyber Operations - Cyber Analytics (PEO EIS)</p>	-	16.187	35.800



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> 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.</p> <p><b>FY 2021 Plans:</b> In 2020, significantly expanded the Army's BDP on the Non-Classified Internet Protocol Router (NIPR) cloud, increasing storage from (6.7) petabytes (PB) to (14) PB. Also, initiated the Secret Internet Protocol Router (SIPR) cloud through a Military Operations Area (MOA) with the National Geospatial Intelligence Agency (NGA) which also provides support to Army Vantage and General Fund Enterprise Business System (GFEBs-SA). In addition, GN was deployed to the Joint Worldwide Intelligence Communications Systems (JWICS) environment by leveraging the Army Military Intelligence Commercial Cloud Services Provider (AC2SP) from the National Ground Intelligence Center (NGIC). Access to Amazon Web Services (AWS) SIPR and JWICS environments in the cloud are rare for organizations outside the Intelligence Community.</p> <p>FY 2021 RDTE Plans: \$13.187M FY 2021 funding supports software and modification to BDP/GN to include engineering, integration, and testing of Capability Releases that support seven main areas of needed capability: First is Multi-Domain, Second is Battlespace Awareness, Third is Intelligence Integration, Fourth is DCO/Cybersecurity, Fifth is Machine Learning/AI, Sixth is Cyber IT/OT (SCADA), and Seventh is DevOps/Lower Echelon Analytic Platform (LEAP). 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 NIPR, SIPR, and JWICS. Enables separate organizations at multiple echelons to develop mutually supporting cyberspace analytics independently. Enriches 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 LEAP.</p> <p>FY 2021 OMA Plans: \$3.000M FY 2021 funding supports GN cloud hosting infrastructure of (3) PB SIPR.</p> <p><b>FY 2022 Plans:</b> FY 2022 RDTE Plans: \$12.300M FY 2022 funding supports software and modification to BDP/GN to include engineering, integration, cybersecurity, and testing of capability releases (11) through (14) leading to Full Operational Capability (FOC). It is anticipated that Cyber Analytics will achieve</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>FOC in 4Q FY 2022. Cyber Analytics capability will be installed and operational on designated infrastructure at the regional and local level to ingest, process, and store corresponding data.</p> <p>FY 2022 OMA Plans: \$23.500M                      FY 2022 funding supports all hosting costs for (10) PB of NIPR that is needed from a strategic perspective to help prevent possible future cyber attacks, (3) PB of SIPR, and (3) PB of JWICS ((2) PB for Cyber Analytics and (1) PB for User Activity Monitoring). Cloud hosting size must be large enough to efficiently ingest all of the data feeds, and any PB increase will also increase the costs of the management tool and managed professional services. FY 2022 funding also supports software and modification to BDP/GN to include engineering, integration, cybersecurity, and testing of capability releases (11) through (14) leading to Full Operational Capability (FOC). It is anticipated that Cyber Analytics will achieve FOC in 4Q FY 2022. Cyber Analytics capability will be installed and operational on designated infrastructure at the regional and local level to ingest, process, and store corresponding data.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>                      FY 2022 funding transferred from RDTE PE 0605041A EV5. The funding increase will support all cloud hosting costs of NIPR/SIPR/JWICS, along with software and modification to BDP/GN to include engineering, integration, cybersecurity and testing of capability releases leading to FOC in 4Q FY 2022. Specifically, installing capabilities on all designated infrastructure at regional DCO levels to ingest, process, and store data. Additionally, network operators / cyberspace defenders at all levels will have required access to conduct missions.</p>				
<p><b>Title:</b> Defensive Cyber Operations (DCO) - Mission Planning (PEO EIS)</p> <p><b>Description:</b> DCO Mission Planning (DCOMP) Solution is a software solution that facilitates situational awareness and understanding, workflow for order execution, and capabilities that bridge the gap between strategic, operational, and tactical cyberspace operators which enable targeted decision support products on existing DCO systems.</p> <p><b>FY 2021 Plans:</b>                      FY 2021 RDTE Plans: \$1.100M                      FY 2021 funding supports development engineering, integration, and testing of one capability release. Delivers mission command and planning at all levels supporting Cyber Defense Forces. Creates a DCO mission execution framework by utilizing the DCOMP Solution to collaborate, understand, plan, and manage DCO missions in real-time. Provides on-demand capabilities within the Army's Big Data Platform (Version 4.1). Offers shared situational awareness amongst cyberspace defenders about their missions and areas of operation. Due to needed re-engineering of the DCOMP Solution to accommodate for a change in the BDP version, the IOC was moved from 4Q FY 2020 to 3Q FY 2021.</p> <p><b>FY 2022 Plans:</b></p>		-	1.100	9.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>FY 2022 RDTE Plans: \$9.000M</p> <p>FY 2022 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 the DCOMP Solution to collaborate, understand, plan, and manage DCO missions in real-time. Offers a shared situational awareness amongst cyberspace defenders about their missions and areas of operation. It is anticipated that Mission Planning will achieve FOC in 4QTR FY 2022. FOC shall be considered attained when DCOMP capabilities are met IAW functional values agreed upon by the capability developer, operational user, program office, and evaluators; FOC additionally requires the DCOMP solution to be capable of autonomously allocating virtual resources and installing DCO tools within the corresponding guest operating systems so that cyberspace defenders can immediately conduct missions upon maneuvering to the supporting infrastructure.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p> <p>FY 2022 funding transferred from RDTE PE 0605041A EV5. The increase in FY 2022 will support development engineering, integration, and testing of three capability releases (software upgrades). These capability releases are critical to reaching FOC by the end of FY 2022. In addition, the DCOMP Solution plans to be transitioned to the JCC2 Program Office at the beginning of FY 2023. Therefore, any requested capabilities from JCC2 that fall within the requirements list will be completed by Defensive Cyber Operations in FY 2022 before the FY 2023 transition.</p>			
<p><b>Title:</b> Defensive Cyber Operations (DCO) - Tools Suite (PEO EIS)</p> <p><b>Description:</b> DCO Tools Suite is a flexible and dynamic software based suite of warfighting capabilities that enables Cyber Protection Teams (CPTs), Regional Cyber Centers (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 (CMF) and cyberspace workforce tasks. They are executed or managed within a DCO platform.</p> <p><b>FY 2021 Plans:</b></p> <p>FY 2021 OPA Plans: \$2.866M</p> <p>FY 2021 funding supports procurement, development engineering, integration, and testing of DCO Tools Suite v3 (perpetual, subscription, and open source tools). 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 advantage and places adversaries at disadvantage in increasingly / 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 violations, as well as the capturing of certain risk behaviors that rate the likelihood of an incident caused by a</p>	-	18.285	26.267

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

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

	FY 2020	FY 2021	FY 2022
<p>trusted insider. FY 2021 funding supports DCO Hardware Kits increased by (20) DDS and (21) GDP requiring additional tool suite licenses.</p> <p>FY 2021 OMA Plans: \$15.419M FY 2021 funding supports license renewals and professional services.</p> <p><b>FY 2022 Plans:</b> FY 2022 OPA Plans: \$6.867M FY 2022 funding supports procurement of new tools and renewal of existing tools providing the following capabilities: New capabilities include Network visualization within the cloud, Security Orchestration Automation and Response (SOAR), Single Node Solution (Operating System pilot), and testing of new requirements like Cyberlens a possible Industrial Control System and Supervisory Data Acquisition solution; and Renewals include capabilities like Discovery (Network), Vulnerability Analysis, Command and Control, Threat Emulation, Acquisitions Data, High Speed Data Transport, Endpoint Detection and Recovery (EDR), intel analysis, Continuous Monitoring, Mitigate/Clear/Remediate, Event Correlation, DevSecOps, license renewals, and new equipment training. A new tools suite will be procured every year. Each new tools suite is derived from ARCYBER's annually published requirements and priorities. Tools suites may differ from year to year as some tools are divested, while new tools are added to include any innovations or advances in technology. DCO Tools Suite v4 will begin in FY 2022, and Tools Suite v5 will drop in FY 2023. The users and operators of the tools are the CPTs and Soldiers. The increase in funding will allow the PM to prototype future tool that may be added the tool suite purchase.</p> <p>FY 2022 OMA Plans: \$19.400M FY 2022 funding support license renewals and professional services.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding transferred from OPA PE 0128B63000. FY 2022 funding increases will support the following: additional testing for Cyberlens software, Single Node Solution (finding a solution to use a smaller deployment footprint of Red Hat), Security Event Incidence Management solution (testing a computer log collection solution), SOAR testing (automating routine manual activities), exploring Industrial Control System and Supervisory Data Acquisition solution. We will add four new tools in FY 2022. In prior years, the tools budgets have been limited which hindered the ability to fully execute the Tools procurement and license renewals requirements. The increase will allow the PM to procure an increased number of tools to the cyber defenders, due to a rapid and dynamically changing threat, and the procurement of license renewals not covered in previous years. This will allow PM DCO to meet ARCYBER's requirements. This will also allow PM DCO to procure capabilities like High Speed Data Transport, Discovery (cloud), Single Node Solutions, Security Event Incidence Management solution, intel, continuous monitoring professional services, training, professional services for the Forge and Armory DevSecOps capabilities, support for the Tactical Server Infrastructure and</p>			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
software support for ARCYBER. That software support includes the aforementioned, an operating system, command and control, network visualization, ISCADADA, Hunt, clearing and remediation, program management, terrain analysis and packet capture.				
<b>Title:</b> Defensive Cyber Operations (DCO) - User Activity Monitoring (PEO EIS)		-	3.639	13.000
<p><b>Description:</b> DCO User Activity Monitoring is the primary capability within the Army's overall Insider Threat (InT) program. UAM is mainly a software-based, scalable solution that has an on-premise solution and a cloud solution. It 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.</p> <p><b>FY 2021 Plans:</b>  FY 2021 RDTE Plans: \$3.639M  FY 2021 funding supports development engineering, integration, and testing of multiple milestones broken into two phases. These milestones support the refinement of the on-premise solution as well as the engineering of the cloud solution. These solutions provide protection against Insider Threat through the deployment of capability in defense of our most critical networks. It also proactively identifies and mitigates internal risks associated with the theft or misuse of critical, mission essential data. It assists with the establishment of the Army's Insider Threat Protection Program that utilizes full-spectrum solutions to assess, deter, and evolve against the Insider Threat. This capability facilitates the ability to identify 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. It integrates the behavioral pattern analysis capability through the use of the Army's Big Data Platform (BDP). The Army will implement UAM for all Soldiers, Civilians, and Contractors with access to JWICS and SIPRNet.</p> <p><b>FY 2022 Plans:</b>  FY 2022 RDTE Plans: \$11.590M  FY 2022 funding supports development engineering, integration, and testing of the cloud based UAM Capability Suite to support ARCYBER and the CIO-G6 Special Access Program (SAP) Community. This entails continued behavioral pattern analysis, license renewals and maintenance, expanding production to tactical end point users, and transition from the on-premise solution to the cloud solution with the Army's Big Data Platform. FY 2022 focuses on the deployable UAM capability that will be configured to monitor, capture, and analyze data in a congested, complex, and highly contested cyberspace and electromagnetic environment. The capability at the tactical level will be tailored to send alerts to a higher level analysis cell (ex. Regional Cyber Center or Combatant Command Joint Cyber Center). FOC will be achieved in 4QTR FY 2022.</p> <p>FY 2022 OMA Plans: \$1.410M</p>				

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>FY 2022 funding support (1) PB cloud hosting for JWICS. UAM Cloud capability will utilize machine learning behavior anomaly detection and data visualization to identify security threats in near real-time.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>                      FY 2022 funding transferred from RDTE PE 0605041A EV5. Funding increase will support procurement of annual licenses and license maintenance, development of UAM analytics, software engineering, integration, and testing of UAM Cloud Capability Suite. The increase in capabilities in FY 2022 are critical to reaching FOC by the end of FY 2022. To achieve FOC by 4QTR FY 2022, production requires deployment to tactical environments, the User Entity Behavioral Analysis (UEBA) tool to be integrated to function as an application on the BDP, integration of the collection tool database with the BDP, implementation of a bi-directional cross-domain solution, support deployment of UAM cloud capability to Army SAP Enterprise Portal, and completion of the UAM cloud capability to support Insider Threat and UAM analysts within ARCYBER.</p>			
<p><b>Title:</b> Defensive Cyber Operations (DCO) - Forensics and Malware Analysis (PEO EIS)</p> <p><b>Description:</b> DCO Forensics and Malware Analysis (F&amp;MA) 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 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.</p> <p><b>FY 2021 Plans:</b>                      FY 2021 OMA Plans: \$1.087M                      FY 2021 funding supports software procurement, integration, and testing for Initial Operating Capability (IOC). The F&amp;MA requirement deploys forensics capability within each theater of operation enabling the Regional Cyber Centers (RCCs) and Cyber Protection Teams (CPTs) to conduct live forensics on critical assets. F&amp;MA provides the 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. The F&amp;MA PoR procured 800,000 EnCase Investigator perpetual licenses to conduct live forensics along with requisite training and professional services for deployment activities. Maintenance for EnCase Investigator must be renewed annually. Ida Pro was purchased to allow the ARCYBER F&amp;MA cell to conduct malware analysis and will be an annual renewal.</p>	-	1.087	3.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>The IOC target date will move from 2Q FY 2021 to 3Q FY 2021. Proof of Concept activities currently underway (and requested by ARCYBER) will inform their decision for the deployment of EnCase Investigator to meet the Army's F&amp;MA mission. Upon receipt of an approved Authority to Operate (ATO) and deployment decision, the F&amp;MA PoR will move forward with the purchase of the SAFE Servers required for EnCase Investigator deployment. Training on the EnCase Investigator capability has been provided (IOC requirement). IOC shall be considered attained when minimum, viable F&amp;MA capabilities are met; the capability can be utilized by the ARCYBER F&amp;MA Cell, Cyber Protection Brigade (CPB), and RCCs; personnel at ARCYBER F&amp;MA Cell, and RCCs have access to the necessary amount of application licenses to collect and analyze images/artifacts from supported organizations' information systems; those within the ARCYBER F&amp;MA Cell and RCCs are fully trained and judged to be capable of analyzing images, artifacts, malware and producing reports/evidence files leading to the prevention, detection and/or recovery across the Army network enterprise.</p> <p>FY 2021 funding also supports prototype activities for the development of a Threat Deception (TD) capability for the Army. Global defenders require the ability to conduct TD operations to detect and respond to advanced persistent threat (APT) within the defended network enclave. Our Cyber Defenders employ this capability to conduct defensive cyberspace operations (DCO) internal defensive measures (DCO-IDM) to detect and respond to adversary malicious presence and actions.</p> <p><b>FY 2022 Plans:</b>            FY 2022 OPA Plans: \$1.900M            FY 2022 funding supports procurement of new F&amp;MA tools and production of the classified threat deception solution. (Potential production contract under the OTA)</p> <p>FY 2022 OMA Plans: \$1.100M            FY 2022 funding supports licenses renewals, maintenance, professional services and potential training activities as well as the delivery of a Sandbox Solution to further meet malware analysis requirements defined in the RDP. The malware analysis capability is a software-based application (Ida Pro) utilized by global and regional defenders to analyze malicious code in a sandbox-like, virtual environment (hardware). The malware sandbox capability will allow cyberspace defenders to collaborate in a member-only, protected environment; submit malware samples, check samples against popular open source tools and identify malware families using correlation and visualization tools.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>            FY 2022 funding transferred from OPA PE 0128B63000. FY 2022 funding increase will support activities to attain IOC of the Threat Deception (TD) solution identified during prototype activities.</p>			

<b>Title:</b> Defensive Cyber Operations (DCO) - Threat Emulation (PEO EIS)	-	1.813	4.000
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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> DCO Threat Emulation capability is a software based suite of tools used to gain access to evaluated networks 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.</p> <p><b>FY 2021 Plans:</b> FY 2021 RDTE Plans: \$1.813M FY 2021 funding supports development engineering, integration, and testing. It provides software based capability that will allow Cyber Protection Teams (CPTs) to assess the ability of systems to withstand an advance persistent threat actor attack by evaluating the people and processes. In FY 2021, the prototype Threat Emulation capability will be assessed (in a closed network) at three different operational locations (RCC-Pacific, RCC-CONUS, and Cyber Quest) to ensure that the capability meets the user's need and identify areas that can be improved in the production phase. Once assessments are completed in the latter part of FY 2021, the capability will be moved into the production phase. This capability will be produced to exist within a contemporary operational environment made up of a collective set of conditions (derived from a composite of actual worldwide conditions) that pose realistic challenges and opportunities for training, leader development, and capabilities development.</p> <p><b>FY 2022 Plans:</b> FY 2022 RDTE Plans: \$4.000M FY 2022 funding supports the production phase and an increase in engineering, integration and testing. During this time, the work in the production phase will ensure that the capability meets all Risk Management Framework (RMF) requirements needed for the capability to be used in an open network. In addition, training, fielding, and support will be provided to IOC designated units (fielding planned for 1QTR FY 2022).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding transferred from RDTE PE 0605041A EV5. In FY 2022, there is an increase in needed funding due to the focus on the production phase activities. Specifically, the increased workload to ensure that the capability meets all RMF requirements needed for the capability to be used in an open network. Also, IOC is planned for 1QTR FY 2022 and this entails additional costs associated with training, travel, fielding, and any adjustments needed to the capability before it is fielded to Soldiers.</p>			
<p><b>Title:</b> Defensive Cyber Operations (DCO) - Management Services (PEO EIS)</p> <p><b>Description:</b> Funding provides program management services and support from a mix of government matrix personnel and contractor management services for implementation, fielding, system engineering, logistics, program management and acquisition support.</p>	-	9.130	14.919



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b><i>FY 2021 Plans:</i></b>  FY 2021 RDTE Plans: \$1.720M  FY 2021 OPA Plans: \$7.410M</p> <p>FY 2021 funding provides continued program management services and support from a mix of government matrix personnel and contractor management services for implementation, fielding, system engineering, logistics, program management and acquisition support.</p> <p><b><i>FY 2022 Plans:</i></b>  FY 2022 RDTE Plans: \$2.070M  FY 2022 OPA Plans: \$12.849M</p> <p>FY 2022 funding provides continued program management services and support from a mix of government matrix personnel and contractor management services for implementation, fielding, system engineering, logistics, program management and acquisition support.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b>  FY 2022 funding increase will provide program management services and support to multiple efforts in all phases of the acquisition process. This includes Cyber Analytics, DCO Mission Planning, Tools Suite, User Activity Monitoring, Forensics and Malware Analysis, and Threat Emulation capabilities. It includes program management costs that pays for a mix of government matrix personnel and contractor management services for development, implementation, fielding, system engineering, logistics, program management and acquisition support.</p>				
<p><b><i>Title:</i></b> Defensive Cyber Operations (DCO) - DCO Development Environment (PEO EIS)</p> <p><b><i>Description:</i></b> DCO Development Environment (DCODE) (formerly Forge) is a physical and virtual assets that provides continual integration, upgrade, assess, optimization and Soldier operational environment. It is designed to provide centralized lifecycle management and consists of the following capabilities: (1) Forge - physical or virtual asset that provides integration and assessment capabilities during the development and integration phases of operations (centrally managed patching and security); and (2) Development Network - provides the capability to remote into multiple networks (provides safe and secure infrastructure framework for Cyber Protection Teams (CPTs)).</p> <p><b><i>FY 2022 Plans:</i></b>  FY 2022 RDTE Plans: \$4.779M</p>		-	-	4.779

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>FY 2022 funding transferred from RDTE PE 0605041A EV5. The funding will continue assessment of new cyber technologies within controlled environment, assesses capabilities in integrated environment, provides virtual training access 24/7 worldwide, and assesses/pushes approved enhancement remotely.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2021 funding is reported under RDTE PE 0605041A EV5.</p>				
<p><b>Title:</b> Defensive Cyber Operations (DCO) - Rapid Cyber Prototyping (ARCYBER)</p> <p><b>Description:</b> ARCYBER Rapid Cyber Prototyping provides software based capabilities that can quickly respond to emerging cyber threats and keep up with threat technology; while supporting Multi-Domain operations. ARCYBER identifies potential development and prototyping efforts via Cyber Needs Forms (CNFs) based on operational feedback, changes in the operational information environment and/or trends of adversarial activity; which drive CONOP and Tactics Techniques and Procedures (TTP) modifications. These are separate and distinct from DCO programmed efforts already funded or budgeted for by PM DCO and are used to rapidly address a network threat/vulnerability.</p> <p><b>FY 2021 Plans:</b> FY 2021 OPA Plans: \$.465M ARCYBER will use FY 2021 funds for Rapid Cyber Prototyping of a capability to observe and analyze Publicly Available Information (PAI) posted on a mission determined social media platforms at high capture rates required to support multi-domain operations (MDO) and joint all domain operations (JADO); and secondly, ARCYBER will conduct operational prototyping of emerging technology and expand on specific capabilities within existing technology in the DCO, Information Operation (IO), and/or Electronic Warfare (EW) domain. ARCYBER will utilize the Soldier Touch Points and Early User feedback/engagement to further mature the capability for the 915th and other organic ARCYBER elements pursuant to MDTF support and AR 10-87 responsibilities.</p> <p><b>FY 2022 Plans:</b> FY 2022 RDTE Plans: \$2.501M ARCYBER will continue to leverage Limited Acquisition Authority (LAA) for solutions that will enable solving more complicated problems that span Cyber, EW, and IO domains through rapid prototyping and capability assessments, which is outside of approved Requirements Definition Packages (RDPs) but within the scope of the FY 2018-2022 IT Box.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding increase will allow ARCYBER to rapidly get after threats with prototypes that fall outside of existing RPDs being developed by PM DCO. The ARCYBER Technical Warfare Center (TWC) Technology Innovation Center (ARCTIC) will add</p>		-	0.465	2.501

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
additional authorities to enter into Cooperative Research and Development Agreements (CRADAs) and Educational Partnership Agreements (EPAs), and enable ARCYBER to prototype, and develop rapid cyber solutions.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	56.706	118.811

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

N/A

**Remarks**

**D. Acquisition Strategy**

The DCO Information System Initial Capabilities Document (IS ICD) was approved on 19 December 2017 by the Army Requirements Oversight Council (AROC). DCO programs are under an IT Box construct with five year term (FY 2018-2022) which aligns with current Requirements Definition Packages (RDPs). IT Box establishes funding thresholds, by appropriation, for a program over the capability's projected lifecycle of five (5) years. Current IT Box will expire in 4QTR FY 2022 and planned to be renewed in 1QTR FY 2022.

The Milestone Decision Authority (MDA), approved the Materiel Development Decision (MDD) on 13 April 2018, designating Tactical DCO Infrastructure (TDI) as an ACAT III program. The TDI program's RDP was approved on 8 November 2018 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. TDI is hosted on the Tactical Server Infrastructure (TSI) and will be fielded by the Command Post Computing Environment/TSI program in accordance with their fielding schedule. The TDI program had a Full Deployment Decision (FDD) of TDI's initial capability approved by the MDA on September 2019, which allowed the program to achieve IOC 1QTR FY 2020. TDI Full Deployment is currently planned for 4QTR FY2022 and is defined as, completion of development and testing of the last capability drop within the IT Box (reaching full functional values of the RDP), and transfer of the capability to the CPCE/TSI program to commence fielding. 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 18 May 2018; Mission Planning on 8 November 2018; User Activity Monitoring and Forensics and Malware Analysis on 18 March 2019; and Threat Emulation on 24 August 2020. The DCODE RDP approval is targeted for 4QFY2021. 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 FY 2018 National Defense Authorization Act (NDAA) Section 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).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	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 DCO Infrastructure (TDI) (PEO C3T)	C/FFP	CACI : Aberdeen Proving Ground, (APG) MD	-	-		0.378		0.582	Mar 2022	-		0.582	Continuing	Continuing	-
DCO - Management Services (PEO EIS)	SS/TBD	Various : Various	-	-		9.130	Feb 2021	14.919	Feb 2022	-		14.919	Continuing	Continuing	-
<b>Subtotal</b>			-	-		9.508		15.501		-		15.501	Continuing	Continuing	N/A

<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	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 DCO Infrastructure (TDI) (PEO C3T)	C/CPFF	Parsons : Aberdeen Proving Ground, (APG) MD	-	-		3.468		4.176	Dec 2021	-		4.176	Continuing	Continuing	-
DCO - Cyber Analytics (PEO EIS)	C/FFP	Army Contracting Command - Rock Island (ACC-RI) : Rock Island, IL	-	-		16.187	Mar 2021	35.800	Mar 2022	-		35.800	Continuing	Continuing	-
DCO - Tools Suite (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		18.285	Mar 2021	26.267	Mar 2022	-		26.267	Continuing	Continuing	-
DCO - Mission Planning (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		1.100	Feb 2021	9.000	Feb 2022	-		9.000	Continuing	Continuing	-
DCO - User Activity Monitoring (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		3.639	Feb 2021	13.000	Feb 2022	-		13.000	Continuing	Continuing	-
DCO - Forensics and Malware (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		1.087	Mar 2021	3.000	Mar 2022	-		3.000	Continuing	Continuing	-
DCO - Threat Emulation (PEO EIS)	C/FFP	ACC-RI : Rock Island, IL	-	-		1.813	Feb 2021	4.000	Feb 2022	-		4.000	Continuing	Continuing	-
DCO - Rapid Cyber Prototyping (ARCYBER)	C/FFP	ACC-RI : Rock Island, IL	-	-		0.465	Apr 2021	2.501	Apr 2022	-		2.501	Continuing	Continuing	-
<b>Subtotal</b>			-	-		46.044		97.744		-		97.744	Continuing	Continuing	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

**Remarks**  
TDI FY21 to FY22 funding increase will provide additional engineering to support completion/Full Deployment of the current IT Box (which plans to be renewed).

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCO - Tactical Development Infrastructure (TDI) (PEO C3T)	MIPR	DLA : Philadelphia, PA	-	-		0.115		0.213	Jun 2022	-		0.213	Continuing	Continuing	-
<b>Subtotal</b>			-	-		0.115		0.213		-		0.213	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCO - Tactical Development Infrastructure (TDI) (PEO C3T)	C/FFP	CACI : Aberdeen Proving Ground, (APG) MD	-	-		1.039		0.574	Mar 2022	-		0.574	Continuing	Continuing	-
DCO - DCO Development Environment (PEO EIS)	MIPR	ATEC, SEC and TYAD : Various	-	-		-		4.779	Jan 2022	-		4.779	Continuing	Continuing	-
<b>Subtotal</b>			-	-		1.039		5.353		-		5.353	Continuing	Continuing	N/A

**Remarks**  
TDI FY21 to FY22 funding decrease due to a reduced amount of testing required. Further efficiency gained through consolidated PM Mission Command test events as a result of leveraging much of the same equipment and support personnel.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	
<b>Project Cost Totals</b>		-	-	56.706	118.811	-	118.811	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Army</b>							<b>Date: May 2021</b>			
<b>Appropriation/Budget Activity</b> 2040 / 8			<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>			<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>				
	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	

**Remarks**  
 FY22 TDI contract award dates reflect when contract option years plan to be exercised/when funding plans to be obligated.

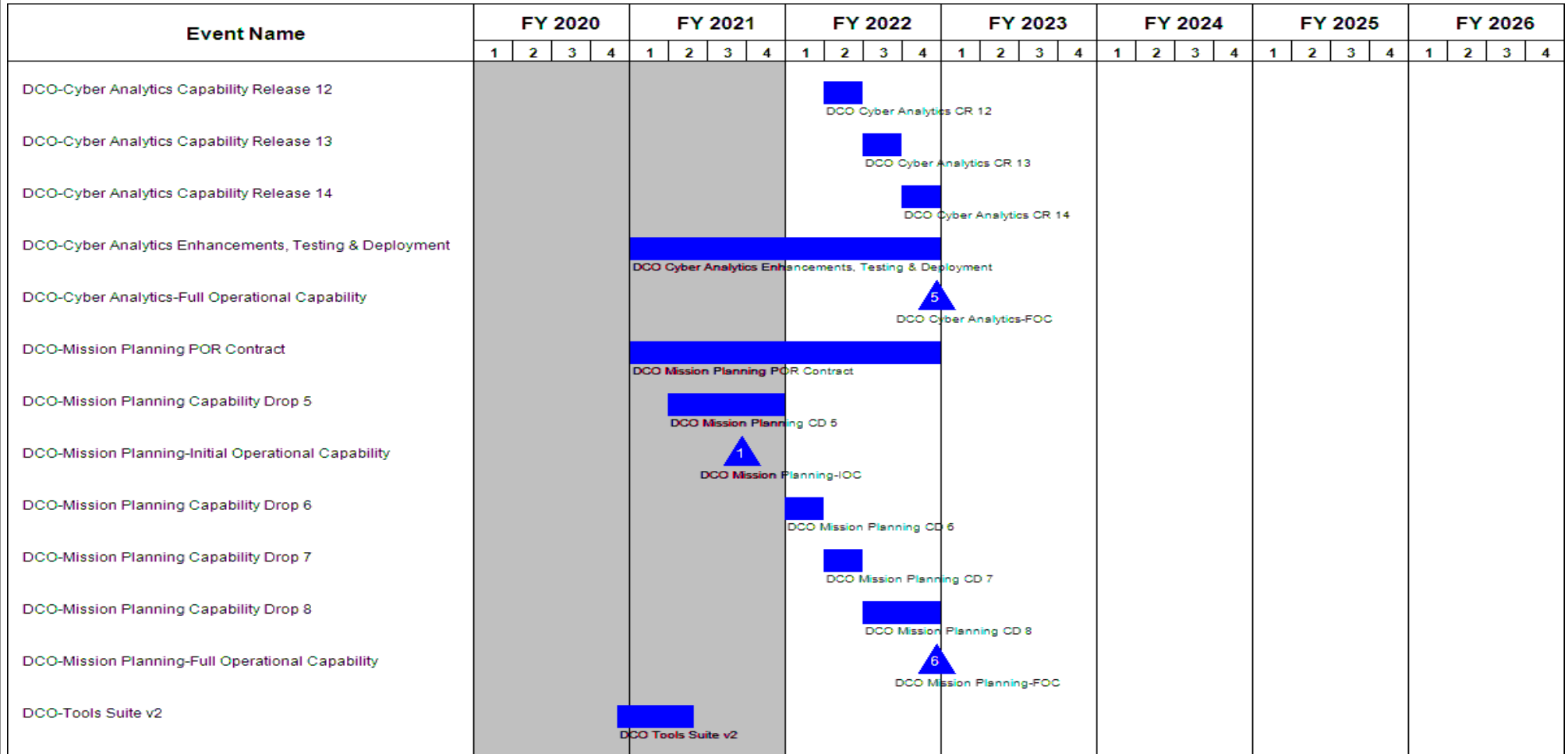
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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>	

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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					[Bar] TDI Dev/Int/Testing-CD 2																							
DCO - TDI Development/Integration/Testing-CD 3									[Bar] TDI Dev/Int/Testing-CD 3																			
DCO - TDI Full Deployment Decision													[Bar] TDI FDD															
DCO - TDI Development/Integration/Testing-CD 4													[Bar] TDI Dev/Int/Testing-CD 4															
DCO - TDI Development/Integration/Testing-CD 5																	[Bar] TDI Dev/Int/Testing-CD 5											
DCO - TDI Development/Integration/Testing-CD 6																					[Bar] TDI Dev/Int/Testing-CD 6							
DCO - TDI Development/Integration/Testing-CD 7																									[Bar] TDI Dev/Int/Testing-CD 7			
DCO - Cyber Analytics POR Contract					[Bar] DCO Cyber Analytics POR Contract																							
DCO-Cyber Analytics Capability Release 7					[Bar] DCO Cyber Analytics CR 7																							
DCO-Cyber Analytics Capability Release 8					[Bar] DCO Cyber Analytics CR 8																							
DCO-Cyber Analytics Capability Release 9					[Bar] DCO Cyber Analytics CR 9																							
DCO-Cyber Analytics Capability Release 10					[Bar] DCO Cyber Analytics CR 10																							
DCO-Cyber Analytics Capability Release 11									[Bar] DCO Cyber Analytics CR 11																			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>





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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	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-Tools Suite v3					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-Tools Suite v4					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-Tools Suite v5					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-Tools Suite v6					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-Tools Suite v7					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-Tools Suite v8					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-User Activity Monitor POR Contract					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-User Activity Monitoring - Behavioral Analysis					[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
DCO-User Activity Monitoring - Integrate with BDP	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
DCO-User Activity Monitoring - Total NET Employment	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
DCO-User Activity Monitoring Capability-Full Operational Capability	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
DCO-Forensics and Malware-Initial Operating Capability	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
DCO-Forensics and Malware - Ida Pro Procurement 1	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026							
	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 - Proprietary Interface																																
DCO-Threat Emulation-Initial Operational Capability													3																			
DCO-Threat Emulation-Full Operational Capability																					9											
DCO-DCO Development Environment																																
DCO-ARCYBER Rapid Cyber Prototyping (Rapid Proto / Capability Assessments)																																

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

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 Full Deployment Decision	4	2022	4	2022
DCO - TDI Development/Integration/Testing-CD 4	1	2023	4	2023
DCO - TDI Development/Integration/Testing-CD 5	1	2024	4	2024
DCO - TDI Development/Integration/Testing-CD 6	1	2025	4	2025
DCO - TDI Development/Integration/Testing-CD 7	1	2026	4	2026
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 Capability 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 Enhancements, Testing & Deployment	1	2021	4	2022
DCO-Cyber Analytics-Full Operational Capability	4	2022	4	2022
DCO-Mission Planning POR Contract	1	2021	4	2022
DCO-Mission Planning Capability Drop 5	2	2021	4	2021
DCO-Mission Planning-Initial Operational Capability	3	2021	3	2021
DCO-Mission Planning Capability Drop 6	1	2022	1	2022

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**Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
DCO-Mission Planning Capability Drop 7	2	2022	2	2022
DCO-Mission Planning Capability Drop 8	3	2022	4	2022
DCO-Mission Planning-Full Operational Capability	4	2022	4	2022
DCO-Tools Suite v2	4	2020	2	2021
DCO-Tools Suite v3	2	2021	4	2021
DCO-Tools Suite v4	2	2022	4	2022
DCO-Tools Suite v5	2	2023	4	2023
DCO-Tools Suite v6	2	2024	4	2024
DCO-Tools Suite v7	2	2025	4	2025
DCO-Tools Suite v8	2	2026	4	2026
DCO-User Activity Monitor POR Contract	1	2021	4	2025
DCO-User Activity Monitoring - Behavioral Analysis	1	2021	2	2022
DCO-User Activity Monitoring - Integrate with BDP	2	2021	3	2022
DCO-User Activity Monitoring - Total NET Employment	1	2022	4	2022
DCO-User Activity Monitoring Capability-Full Operational Capability	4	2022	4	2022
DCO-Forensics and Malware-Initial Operating Capability	3	2021	3	2021
DCO-Forensics and Malware - Ida Pro Procurement 1	2	2021	2	2022
DCO-Forensics and Malware - Sandbox Solution	1	2022	4	2022
DCO-Forensics and Malware - Ida Pro Procurement 2	2	2022	2	2023
DCO-Forensics and Malware-Full Operating Capability	4	2022	4	2022
DCO-Forensics and Malware - Ida Pro Procurement 3	2	2023	2	2024
DCO-Forensics and Malware - Ida Pro Procurement 4	2	2024	2	2025
DCO-Forensics and Malware - Ida Pro Procurement 5	2	2025	2	2026
DCO-Forensics and Malware - Encase Investigator Maintenance (BY)	2	2021	2	2022
DCO-Forensics and Malware - Encase Investigator Maintenance (OY1)	2	2022	2	2023

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 8	<b>R-1 Program Element (Number/Name)</b> PE 0608041A / <i>Defensive CYBER - Software Prototype Development</i>	<b>Project (Number/Name)</b> CD1 / <i>Defensive Cyber - Software Prototype Devel</i>

Events	Start		End	
	Quarter	Year	Quarter	Year
DCO-Forensics and Malware - Encase Investigator Maintenance (OY2)	2	2023	2	2024
DCO-Forensics and Malware - Encase Investigator Maintenance (OY3)	2	2024	2	2025
DCO-Threat Emulation POR Contract	1	2021	4	2025
DCO-Threat Emulation - Social Engineering Toolkit	1	2021	3	2021
DCO-Threat Emulation - Exploit Code Generator	3	2021	2	2022
DCO-Threat Emulation - Proprietary Interface	1	2022	4	2022
DCO-Threat Emulation-Initial Operational Capability	1	2022	1	2022
DCO-Threat Emulation-Full Operational Capability	4	2024	4	2024
DCO-DCO Development Environment	1	2022	4	2022
DCO-ARCYBER Rapid Cyber Prototyping (Rapid Proto / Capablity Assessments)	3	2021	2	2023

**Note**

TDI field decisions will occur after the completion of each TDI capability drop.

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).

Current DCO and TDI IT box ends in FY 2022. Army Capabilities Manager (ACM), formerly TRADOC Capability Manager (TCM)) is working to renew the IT Box construct for FY 2023-2027.