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

May 2021



**Army**

*Justification Book of*

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

**RDT&E – Volume II, Budget Activity 5B**

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Army • Budget Estimates FY 2022 • RDT&E Program

**Table of Contents**

**Introduction and Explanation of Contents..... ii**

**Comptroller Exhibit R-1..... xi**

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

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

**Exhibit R-2s..... 1**



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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>Budget Activity</u>	<u>OSDPE / Project</u>	<u>Project Title</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.



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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

<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

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

UNCLASSIFIED

Page III

xii



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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
<hr/>			
Summary Recap of Non-RDT&E Title FYDP Programs			
-----			
Central Supply and Maintenance	890,830	942,493	1,001,231
Total Research, Development, Test & Evaluation	890,830	942,493	1,001,231

## UNCLASSIFIED

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

Summary Recap of Budget Activities	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request
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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 & Eval, Army

Line No	Program Element Number	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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	S e c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	S e c
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

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



UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	S e c
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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se
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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

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

UNCLASSIFIED

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 & Eval, Army

Line No	Program Element Number	Item	Act	FY 2020 Actual*	FY 2021 Enacted**	FY 2022 Request	Se
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

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

UNCLASSIFIED

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 & 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***

<b>Line #</b>	<b>Budget Activity</b>	<b>Program Element Number</b>	<b>Program Element Title</b>	<b>Page</b>
108	05	0604802A	Weapons and Munitions - Eng Dev.....	1
109	05	0604804A	Logistics and Engineer Equipment - Eng Dev.....	185
110	05	0604805A	Command, Control, Communications Systems - Eng Dev.....	272
111	05	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev.....	284
112	05	0604808A	Landmine Warfare/Barrier - Eng Dev.....	306
113	05	0604818A	Army Tactical Command & Control Hardware & Software.....	341
114	05	0604820A	Radar Development.....	442
115	05	0604822A	General Fund Enterprise Business System (GFEBS).....	453
116	05	0604823A	Firefinder.....	468
117	05	0604827A	Soldier Systems - Warrior Dem/Val.....	482
118	05	0604852A	Suite of Survivability Enhancement Systems - EMD.....	508
119	05	0604854A	Artillery Systems - EMD.....	528

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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>
Army Tactical Command & Control Hardware & Software	0604818A	113	05.....	341
Artillery Systems - EMD	0604854A	119	05.....	528
Command, Control, Communications Systems - Eng Dev	0604805A	110	05.....	272
Firefinder	0604823A	116	05.....	468
General Fund Enterprise Business System (GFEBS)	0604822A	115	05.....	453
Landmine Warfare/Barrier - Eng Dev	0604808A	112	05.....	306
Logistics and Engineer Equipment - Eng Dev	0604804A	109	05.....	185
Medical Materiel/Medical Biological Defense Equipment - Eng Dev	0604807A	111	05.....	284
Radar Development	0604820A	114	05.....	442
Soldier Systems - Warrior Dem/Val	0604827A	117	05.....	482
Suite of Survivability Enhancement Systems - EMD	0604852A	118	05.....	508
Weapons and Munitions - Eng Dev	0604802A	108	05.....	1

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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army										Date: May 2021		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)					PE 0604802A / Weapons and Munitions - Eng Dev							
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	-	182.119	268.858	309.778	-	309.778	-	-	-	-	-	-
613: MORTAR SYSTEMS	-	5.554	1.358	-	-	-	-	-	-	-	-	-
BQ3: 155mm Artillery Propulsion XM654	-	-	-	34.461	-	34.461	-	-	-	-	-	-
BY1: Next Generation Combat Vehicle Ammunition	-	-	22.176	33.867	-	33.867	-	-	-	-	-	-
CE3: Precision Munition (Sniper)	-	-	-	9.275	-	9.275	-	-	-	-	-	-
EC4: Non-Standard Simulator Munitions	-	2.536	2.154	2.116	-	2.116	-	-	-	-	-	-
ED7: Advanced Multipurpose (AMP) Cartridge	-	13.520	-	-	-	-	-	-	-	-	-	-
EL9: Ammunitions Logistics Prototyping	-	2.233	1.639	0.696	-	0.696	-	-	-	-	-	-
EP2: Shoulder-Launched Munitions	-	3.931	10.011	0.987	-	0.987	-	-	-	-	-	-
EP3: Reduced Range Ammunition - Small Caliber	-	6.000	13.816	14.000	-	14.000	-	-	-	-	-	-
EP4: One-Way Luminescence for Small Caliber Ammo	-	8.195	13.467	6.896	-	6.896	-	-	-	-	-	-
EP7: Aviation Airborne Expendable Countermeasures	-	4.717	4.313	7.526	-	7.526	-	-	-	-	-	-
EU4: 40mm HV Improved High Explosive Dual Purpose	-	12.517	8.046	2.111	-	2.111	-	-	-	-	-	-
EU5: .50 Caliber All-Purpose Tactical cartridge (APTC)	-	-	3.931	-	-	-	-	-	-	-	-	-
EU6: 155mm HE Rocket Assist Project Extended Range	-	18.804	51.095	27.655	-	27.655	-	-	-	-	-	-

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

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>												
2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>												
<i>EU7: Enhanced Lethality Cannon Munitions</i>	-	8.362	-	-	-	-	-	-	-	-	-	-	-
<i>EU8: Improved Multi-Option Fuze</i>	-	9.589	7.700	4.562	-	4.562	-	-	-	-	-	-	-
<i>EW1: 40mm Low Velocity Ammunition</i>	-	13.454	21.659	3.640	-	3.640	-	-	-	-	-	-	-
<i>FA6: 30mm Lethality</i>	-	26.030	19.358	8.939	-	8.939	-	-	-	-	-	-	-
<i>FJ4: Cannon-Delivered Area Effects Munitions (C-DAEM)</i>	-	-	26.593	89.138	-	89.138	-	-	-	-	-	-	-
<i>FL4: Small Caliber Ammo for Next Gen Squad Weapons</i>	-	17.432	26.483	28.372	-	28.372	-	-	-	-	-	-	-
<i>S36: Precision Guidance Kit</i>	-	29.245	32.147	35.537	-	35.537	-	-	-	-	-	-	-
<i>XT2: 40mm Door Breach</i>	-	-	2.912	-	-	-	-	-	-	-	-	-	-

**Note**  
 Transitions: In Fiscal Year (FY) 2022, Project BQ3, 155mm Artillery Propulsion, will transition from Budget Activity (BA) 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition, Project BQ4, 155mm Artillery Propulsion. Project BQ3 is not a FY 2022 new start.

Project XT2, 40mm Door Breach transitioned to procurement. There is no FY 2022 budget request.

New Start: Project CE3, Precision Munition (Sniper) is a new start in FY 2022.

Elimination: Project 613, Mortar Systems is complete. There is no FY 2022 budget request.

Project EU5, .50 Caliber All-Purpose Tactical cartridge (APTC) is complete. There is no FY 2022 budget request.

**A. Mission Description and Budget Item Justification**  
 PE 0604802A Weapons and Munitions - Eng Dev funds multiple efforts for the engineering development of weapons and munitions systems.

Project 613, Mortar Systems: This Project supports Mortar System & Fire Control Modernization (MS&FCM) activities. The Mortar System and Fire Control Modernization Project funds engineering development and demonstration of new technologies that will support modernized mortar weapon and mortar fire control systems. This includes capabilities that provide commonality between current and future weapon and fire control systems to help mitigate technology shortfalls and critical capability gaps. Future mortar systems that address these gaps include (but are not limited to) remote mortar turrets for mounted mortar systems, high-pressure

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	
<p>capable cannons/components, and composite/lightweight components for dismounted systems. Mortar Fire Control Systems capabilities include lightweight inertial measurement and navigation (IMU/INU) units for weapon pointing, simplified Ethernet/wireless-based digital communications interfaces, development of updated fire control software to enable commonality, integration with existing/future platform interfaces, and support for commercial off-the-shelf (COTS)/modified commercial off-the-shelf (MCOTS) fire control components. In Fiscal Year (FY) 2022, this Project does not have a Research Development Test and Evaluation (RDT&amp;E) budget request.</p> <p>Project BQ3, 155mm Artillery Propulsion: Supercharge is a stand-alone top-zone 155 millimeter (mm) propelling charge required to achieve maximum range requirements from the XM1299 Increased Range (formerly Increment 1C) and XM1299A1 Increased Rate of Fire (formerly Increment 2) Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). It will achieve lethality overmatch out to 70 kilometers (km) with developmental extended range projectiles, and will potentially increase range with compatible legacy projectiles up to thirty percent. Supercharge is composed of an earlier bag variant and later combustible cartridge case (foamed celluloid or felted fiber technology), integral metal Stub Case, electrically initiated primer, and advanced artillery propellant. Fiscal Year (FY) 2022 funding will support efforts for aforementioned two parallel Supercharge variants (bag and cased) to support the concurrent development of ERCA Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with automated loading system. This project supports Bag Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of XM1299 ERCA Increased Range that will perform Operational Assessment. This project also supports concurrent engineering, manufacturing development of the Cased Supercharge for future fielding with ERCA IRF. These efforts directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.</p> <p>Project BY1, Next Generation Combat Vehicle Ammunition: 50x228 millimeter (mm) family of ammunition is a critical technology development in response to the Next Generation Combat Vehicle (NGCV) Abbreviated Capability Development Document for weapon qualification, platform integration, and fielding of the Optionally Manned Fighting Vehicle (OMFV) primary weapon system (XM913). This effort includes the development of three capabilities: The XM1202 Target Practice with Trace (TP-T); the XM1203 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T); and the XM1204 High Explosive Airburst with Trace (HEAB-T). The training cartridge will allow the Warfighter to train in a cost effective manner and the tactical cartridges will provide enhanced lethality at increased ranges when engaging personnel threats in the open, defilade, and under the cover of urban structures, Anti-Tank Guided Missiles (ATGM) teams, and current and projected future peer armored materiel threats. This effort is operating under Middle Tier Acquisition authority for rapid prototyping to qualify the three munitions in order to support the NGCV Cross Functional Team (CFT) timeline for First Unit Equipped (FUE). Fiscal Year (FY) 2022 funding will support Design Engineering Tests (DET) to confirm TP-T and APFSDS-T safety, performance, and ruggedness as well as the assessment of HEAB-T fuze safety and function.</p> <p>Project CE3, The Precision Munition (Sniper) project is a critical technology development in response to the Precision Munition Capabilities Development Documents (CDD) for the ammunition required to support the Precision Sniper Rifle (PSR) / sniper weapons systems. The objective is to transfer the latest lethality technology into the suite of ammunition used by snipers. The Precision Munition improvement is split into three capability areas: Anti-Materiel (AM), Improved Performance Round (IPR), and Subsonic. The AM and IPR capabilities will enhance lethal effects at greater distances. The Subsonic capability will increase soldier survivability at close range by providing a low-sound signature munition that is undetectable to the enemy. Fiscal Year (FY) 2022 funding supports rapid development of the AM munitions and evaluation of ammunition prototypes/concepts. FY 2022 also supports rapid development of the IPR munitions by manufacturing and maturing prototype designs. Also, FY 2022 supports evaluating and maturing industry Subsonic munitions solutions and conducting safety testing.</p>		

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	
<p>Project EC4, Non-Standard Simulator Munitions will standardize various pyrotechnics that simulate battlefield effects. The Army's Combat Training Centers (CTCs) are currently using non-standard munitions to replicate both conventional and asymmetric warfare battlefield effects. These modified commercial-off-the-shelf products have not been type classified or material released and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/simulators to replicate both conventional and asymmetric warfare battlefield affects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Mini Blast to simulate hostile fire and small Improvised Explosive Devices (IEDs) during mounted operations in urban terrain; Micro pyrotechnics to simulate indoor hostile fire and IED effects that are capable of being integrated into existing facilities; Rocket Propelled Grenade (RPG) simulators to replicate the flight of a Rocket Propelled Grenade; High Order Blast Effect (HiOBE) used to replicate a Vehicle Borne Improvised Explosive Device (VBIED), building explosions, and other significant explosive events; Artillery airburst simulator to replicate indirect fire; simulator to replicate a STINGER firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems and mitigate environmental concerns and safety risks associated with realistic scenario based training. FY 2022 funding will support the development of Yellow Smoke, RPG on a wire, Mini Blast, Tracer, HiOBE, and Micro pyrotechnic simulators.</p> <p>Project ED7, Advanced Multipurpose (AMP) Cartridge: The XM1147 Advanced Multi Purpose (AMP) program is a direct fire line of sight 120 millimeter (mm) large caliber munition under development for the Abrams Main Battle Tank. AMP has three modes of operation including point detonate, point detonate delay, and airburst. AMP is the materiel solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50 Meter (m) to 2000m threshold and 50m to 4500m objective, a validated gap that cannot currently be met with existing stockpiled ammunition. In addition to added capability, AMP will also consolidate the capabilities of four existing stockpiled 120mm munitions, thereby addressing the users' battlecarry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including ATGM teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breach modification, the same required by the 120mm M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. In FY 2022, this Project does not have a RDT&amp;E budget request.</p> <p>Project EL9, Ammunition Logistics Prototyping: This Project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. Fiscal Year (FY) 2022 funding will be focused on integrating commercial off the shelf and/or relatively mature technologies into ammunition resupply enablers required by the Long Range Precision Fire (LRPF) Cross Functional Team (CFT). They will be focused on ensuring that a low risk resupply process solution exists to support the success of the Extended Range Canon Artillery (ERCA).</p> <p>Project EP2, Shoulder-Launched Munitions: The XM919 Individual Assault Munition (IAM) will be a lightweight Shoulder Launched Munition (SLM) capability for combat units at the individual Soldier level. As the next generation SLM, the solution will fit within the Soldier Lethality Modernization Priority, by reducing Soldier load, while providing tactical innovation capable of</p>		



**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>
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extending overmatch against near-peer adversaries in a joint, multi-domain, high-intensity conflict. The XM919 IAM will allow Soldiers to conduct Urban Operations and will allow Soldiers to defeat adversaries protected by field expedient structures and light armored vehicles while providing behind the wall lethality effects. This solution will be effective day or night with the ability to safely engage targets from within enclosures, increasing Soldier survivability. This solution will combine the capabilities of the existing Bunker Defeat Munition (BDM) and the AT4 Confined Space - Reduced Sensitivity (AT4CS-RS), which will reduce the logistics burden of having to maintain and train multiple systems. The Individual Assault Munition Capabilities Development Document (CDD) was approved on 11 March 2016. FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation in support of a Milestone C decision.

Project EP3, Reduced Range Ammunition - Small Caliber: The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62 millimeter (mm) and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. Fiscal Year (FY) 2022 funding supports completing Engineering and Manufacturing Development (EMD) efforts, conducting Production Qualification Testing (PQT), and performing activities to prepare for ammunition production transition to the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) on the 7.62mm variant. FY 2022 also includes continuing the EMD effort, conducting safety release testing, conducting a Limited User Assessment (LUA) / User Evaluation, and performing PQT on the 50 caliber variant.

Project EP4, One-Way Luminescence for Small Caliber Ammo: The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62 millimeter (mm) and 5.56mm Families of Ammunition Capabilities Development Documents (CDD) and .50 Caliber Munitions CDD. Current small caliber ammunition tracer rounds are a pyrotechnic tracer mix which allows enemy forces to see the trace round and track its trajectory back to the shooter. The OWL projects objective is to develop and field a full tracer round, replace the current pyrotechnic cartridges with trace cartridges that are only visible to the shooter and soldiers in close proximity, increasing soldier survivability, and increasing lethality by incorporating Enhanced Performance Round (EPR) technology into the new tracer ammunition. 7.62mm and 5.56mm are the immediate focus; later followed by .50 Caliber cartridges and Next Generation Squad Weapons (NGSW) ammunition. Fiscal Year (FY) 2022 funding will support continuing Engineering and Manufacturing Development (EMD), performing Production Qualification Testing (PQT), conducting Live Fire Test and Evaluation (LFT&E), conducting a Critical Design review (CDR), conducting a Limited User Evaluation (LUE), and performing preparation activities for manufacturing at the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) for the 7.62mm variant. FY 2022 funding will also support EMD efforts, a Preliminary Design Review (PDR), Pre-Production Qualification Testing (PPQT), and a Soldier Touch Point STP / User Evaluation for the 5.56mm variant. FY 2022 also supports assessing OWL technologies for the potential to adapt the technology into other small caliber ammunition variants.

Project EP7, Aviation Airborne Expendable Countermeasures (AAECM) will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on expendable countermeasure flares and decoys to include the XM215 Infrared (IR) countermeasure Flare and XM20 Radio Frequency (RF) expendables. These expendable countermeasures systems are an essential part of survivability equipment for Army aircraft. Army Research Development Technology & Evaluation (RDT&E) efforts are coordinated with Program Executive Office (PEO) Aviation to address the AAECM capability, a critical

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	
<p>enabler for enduring aircraft and the Future Vertical Lift (FVL) - Aircraft Survivability Equipment (ASE) Cross Functional Team (CFT) within Army's Top modernization priorities.</p> <p>These advanced decoys will address deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and proliferated current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, environmental considerations, safety enhancements, manufacturing enhancements, qualification of other service and foreign munitions that could meet current requirements, product improvements, insertion of new technologies to increase performance, and enhancement of current flare solutions for new and existing aircraft. Systems include impulse cartridges and aircraft expendables (to include RF expendables). FY 2022 will support the final prototype build, development testing, and operational testing of the XM215 design as well as operational test and evaluation for the XM20 design.</p> <p>Project EU4, 40mm High Velocity (HV) High Explosive Dual Purpose: 40 millimeter (mm) High Velocity (HV) High Explosive Dual Purpose - Airburst (HEDP-AB) is a new capability identified in the 40mm High Velocity Improved High Explosive Dual Purpose Cartridge Capability Development Document (CDD) and will provide the Mk19 Mod 3 Grenade Machine Gun (GMG) an airburst capable cartridge with the ability of achieving required lethal effects against enemy targets in the open and in defilade while maintaining the capability to defeat unarmored and lightly armored vehicles. Fiscal Year (FY) 2022 funding supports the completion of Developmental Test &amp; Evaluation (DT&amp;E), completion of a Limited User Evaluation (LUE), Milestone-C preparation activities and preparation activities for the Low Rate Initial Production 1 (LRIP 1) contract award.</p> <p>Project EU5, .50 Caliber All-Purpose Tactical cartridge (APTC): The APTC project is a critical technology development in response to the .50 caliber Munitions Capabilities Development Documents (CDD). The overall objective of All-Purpose Tactical Cartridge is to deliver Ball and Tracer ammunition that replaces and improves current legacy .50 caliber ammunition. The All-Purpose Tactical Cartridge will be compatible with all Army .50 caliber weapons but specifically optimized to work in the M2 Machine Guns. There is no Fiscal Year (FY) 2022 request.</p> <p>Project EU6, 155mm HE Rocket Assist Project Extended Range: The 155mm High Explosive (HE) Rocket Assisted Projectile, Extended Range Project supports projectile development efforts to achieve ranges of 40km in current 39 caliber artillery weapon systems and longer ranges in future 58 caliber Extended Range Cannon Artillery (ERCA) weapon systems to achieve the Army's requirement of extended range lethality by FY 2023. The Project is executing an evolutionary approach consisting of two parallel efforts to meet the objectives of extended range and precision. The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1113E1 will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA in FY 2023. These efforts will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. FY 2022 funding will support the completion of activities to ensure that the XM1113 is safe, suitable and operationally effective in current artillery systems, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and the continuation of ERCA compatibility efforts. FY 2022 funding will also support ongoing XM1113E1 development and qualification activities to support the Army's modernization priorities.</p> <p>Project EU7, Enhanced Lethality Cannon Munitions: The Enhanced Lethality Cannon Munitions (ELCM) Project will evaluate, develop, and qualify new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>
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production. The ELCM Project supports testing and assessment of the Israeli Military Industries (IMI) Systems M999 advanced anti-personnel munition in support the Army Directed Requirement for a Rapid Bridging Solution for the replacement of the 155mm Dual Purpose Improved Conventional Munition (DPICM). This Project also accelerates the qualification of the 155mm XM1128 High Explosive Projectile, which will replace the M795 Critical Munition once qualified. Engineering efforts are ongoing and will support the evaluation of the XM1128 test data to determine that the Program is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C in FY 2021. In FY 2022, this Project does not have a RDT&E budget request.

Project EU8, Improved Multi-Option Fuze: The Improved Multi-Option Fuze Project is a technology refresh and modernization effort that provides an incremental capability with technology advancements and performance improvements on the current non-precision artillery and mortar ammunition proximity multi-option fuze that will increase robustness to electronic countermeasures (ECM), eliminates the susceptibility of reverse engineering (RE), incorporates power source advancements, improves delay mode reliability, and integrates safe & arm improvements. This Project will develop and qualify safe, affordable, reliable, Proximity Height of Burst fuzing solutions with robust Defense Exportability Features (DEF) for non-precision conventional cannon artillery and mortar munitions that are resistant to adversary exploitation via ECM and RE threats. FY 2022 funding will support the completion of Multi-Option Fuze Artillery (MOFA) II and Improved Multi-Option Fuze Mortar (iMOFM) hardware fabrication required for design verification and qualification testing. Funding will also support engineering efforts to evaluate test data to ensure that MOFA II and iMOFM are safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C.

Project EW1, 40mm Low Velocity Ammunition: The 40 millimeter (mm) Low Velocity High Explosive Air Burst (HEAB) is a new capability identified as a Warfighter requirement in the Capability Development Document (CDD), 40mm Low Velocity (LV) Family of Ammunition Annex. The HEAB tactical cartridge allows the Warfighter to engage targets at increased effective ranges using the 40mm M320 Grenade Launcher. The HEAB cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges resulting in increased soldier survivability. FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3).

Project FA6, 30mm Lethality: The 30 millimeter (mm) Lethality project funds the development of a suite of 30x173mm caliber cartridges, which includes a XM1182 High Explosive Airburst with Trace (HEAB-T) cartridge for increased anti-personnel effects, XM1170 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) cartridge for anti-materiel, and ballistically matched training cartridges; XM1173 Target Practice with Trace (TP-T) cartridge and XM1172 Target Practice Discarding Sabot with Trace (TPDS-T) cartridge. The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV), Next Generation Combat Vehicle (NGCV), and any Army Fighting Vehicles that are equipped with a 30x173mm weapon system. The tactical APFSDS-T cartridge will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging light-to-medium armored vehicles. The HEAB-T cartridge will provide the Warfighter with increased lethality against troops in the open, counter defilade, Anti-Tank Guided Missile (ATGM) teams, and troops behind urban structures. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This project is a follow-on of the earlier efforts in support of the United States Army Europe (USAREUR) Operational Needs Statement (ONS) #15-20590 Stryker Increased Lethality for the 2nd Cavalry Regiment (2CR). Fiscal Year (FY) 2022 funding will support the continuation of Engineering, Manufacturing and Development (EMD) for all cartridges to include Developmental Test & Evaluation (DT&E) and preparation for Milestone C decision.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	
<p>Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM): The Cannon-Delivered Area Effects Munitions (C-DAEM) Project will provide U.S. ground forces with the capability to engage area personnel through armored targets, while denying threat forces full operational freedom within the targeted area. An Analysis of Alternatives (AoA) was completed in January 2018 to inform Army acquisition and investment decisions regarding replacement of the current stockpile of 155mm Dual Purpose Improved Conventional Munitions (DPICM) with DoD policy compliant munitions and address anti-armor and extended range capability requirements. The Army validated two materiel solutions for C-DAEM to be pursued in parallel to support the Army's modernization priorities. C-DAEM Armor will destroy moved and moving infantry fighting vehicles, self-propelled howitzers and tanks. C-DAEM DPICM Replacement will destroy personnel to soft-skinned vehicles. FY 2022 funding will support the continued development and testing of the most promising C-DAEM Armor candidates(s) for Urgent Materiel Release (UMR) in FY 2023, engineering efforts required to integrate the NavStorm-M Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s) and will support testing and qualification activities for C-DAEM DPICM Replacement solution(s) to ensure safety, performance and DoD policy compliance verification.</p> <p>Project FL4, Small Caliber Ammo for Next Gen Squad Weapons: The Small Caliber Ammo for Next Gen Squad Weapons project is a critical technology development in response to the Soldier Lethality Cross Functional Team (SL CFT) Initial Capability Document (ICD) for the ammunition required to support the rapid prototyping, development, and fielding of the Next Generation Squad Weapons (NGSW) under the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding. The objective is to develop and Full Materiel Release (FMR) the new ammunition in parallel with the NGSW rifle and automatic rifle. The NGSW ammunition is split into multiple ammunition variants, the General Purpose (GP), the Special Purpose (SP), the Reduced Range Ammunition (RRA), Tracer Ammunition, Blank Ammunition, the Close Combat Mission Capability Kit (CCMCK) training ammunition, Drill Dummy Inert (DDI) cartridge, and High Pressure Test (HPT) cartridge. Fiscal Year (FY) 2022 funding supports completing the GP rapid prototyping/development effort and starting the GP optimization effort. FY 2022 also supports continuing rapid prototyping for the SP projectile, manufacturing prototype ammunition required for safety testing, and conducting safety testing. FY 2022 supports continuing rapid prototyping efforts to develop RRA and RRA-Tracer for the NGSW, conducting a Critical Design Review (CDR), and manufacturing prototype ammunition required for safety testing. FY 2022 also supports continuing rapid prototyping effort to develop tracer ammunition for the NGSW, conducting a Preliminary Design Review (PDR), building and testing tracer ammunition prototypes, and maturing/refining down-selected tracer ammunition design. FY 2022 supports continuing rapid prototyping effort to mature the Blank ammunition and activities to accelerate the development/maturation of Blank ammunition designs. FY 2022 also supports the start of rapid prototyping effort to develop CCMCK training ammunition for the NGSW, building and evaluating competing CCMCK training ammunition designs/concepts, down-selecting to a CCMCK design, begin the process of maturing/refining selected design by performing engineering tests and implementing improvements based upon test results. FY 2022 also initiates the refined development of the DDI and HPT cartridges. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding for this project aligns with the Army's priorities in support of the National Defense Strategy.</p> <p>Project S36, Precision Guidance Kit: The Long Range-Precision Guidance Kit (LR-PGK) XM1171/XM1172 development effort will qualify state of the art technologies for a course correcting fuze that provides precision accuracy at extended ranges for current and future 155 millimeter (mm) High Explosive (HE) projectiles by eliminating a portion of the inherent errors associated with ballistic firing solutions, which effectively reduces the number of projectiles required to execute fire missions. LR-PGK will support projectile operation in Global Positioning System (GPS) degraded environments and compatibility with Army Modernization objectives under the Long Range Precision Fires Cross Functional Team's (LRPF CFT) new long range cannon, Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). The ERCA and its new long range projectiles require the LR-PGK to meet lethality requirements. Fiscal Year (FY) 2022 funding supports the fabrication of LR-PGK qualification test hardware and completion of guided flight testing with the XM1113ER projectile, XM655E1 Supercharge propellant and the ERCA weapon platform and accomplishes a system Critical Design Review (CDR) in support of Safety Release for First Unit Issued (FUI) for the ERCA Increased Range Operational Assessment.</p>		

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>
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Project XT2, 40mm Door Breach: The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door to create an entry point into a building or other structure. This capability is critical during Urban Operations, while having stand-off ability to conduct ballistic breach at ranges up to 50 meters away, with a single-shot, and without pause between actual breach and entry of initial force. The 40mm DB cartridge will provide the small unit with the capability to conduct efficient breaching operations; allowing the Warfighter to create an entry point into a structure for an assault element to enter and begin clearing operations, one of the most difficult types of operations that Soldiers may face in an urban environment. The 40mm DB cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. In FY 2022, this Project does not have a RDT&E budget request.

<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	186.323	265.811	252.058	-	252.058
Current President's Budget	182.119	268.858	309.778	-	309.778
Total Adjustments	-4.204	3.047	57.720	-	57.720
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-8.250			
• Congressional Rescissions	-	-			
• Congressional Adds	-	21.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.053	-			
• SBIR/STTR Transfer	-7.257	-9.703			
• Adjustments to Budget Years	-	-	57.720	-	57.720

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** EU6: *155mm HE Rocket Assist Project Extended Range*

Congressional Add: *Precision Guidance Aft*

	<b>FY 2020</b>	<b>FY 2021</b>
	10.000	21.000
Congressional Add Subtotals for Project: EU6	10.000	21.000
Congressional Add Totals for all Projects	10.000	21.000

**Change Summary Explanation**

FY 2022 Program Element (PE) 0604802A increase is largely attributed to Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM), due to transition of C-DAEM Armor efforts from Budget Activity 04, PE 0603639A, Project FG1, Cannon-Delivered Area Effects Munitions. In FY 2022, C-DAEM Armor transitions from competitive demonstration phase and risk reduction activities to initiation of development and qualification efforts for selected solution(s) to support Urgent Materiel Release.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	
<p>The FY 2022 PE increase is also attributed to Project BQ3, 155mm Artillery Propulsion, FY 2022 transition from Budget Activity 04, PE 0603639A, Tank and Medium Caliber Ammunition, Project BQ4, 155mm Artillery Propulsion. FY 2022 supports multiple, high quantity test events to qualify Bag Supercharge with XM1299 ERCA Increased Range, and to continue concurrent development of Cased Supercharge for future fielding with ERCA Increased Rate of Fire.</p>		

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS
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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
613: MORTAR SYSTEMS	-	5.554	1.358	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
Elimination: Project 613, Mortar Systems is complete. There is no FY 2022 budget request.

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

The Mortar System and Fire Control Modernization Project funds engineering development and demonstration of new technologies that will support modernized mortar weapon and mortar fire control systems. This includes capabilities that provide commonality between current and future weapon and fire control systems to help mitigate technology shortfalls and critical capability gaps. Future mortar systems that address these gaps include (but are not limited to) remote mortar turrets for mounted mortar systems, high-pressure capable cannons/components, and composite/lightweight components for dismounted systems. Mortar Fire Control Systems capabilities include lightweight inertial measurement and navigation (IMU/INU) units for weapon pointing, simplified Ethernet/wireless-based digital communications interfaces, development of updated fire control software to enable commonality, integration with existing/future platform interfaces, and support for commercial off-the-shelf (COTS)/modified commercial off-the-shelf (MCOTS) fire control components. There is no FY 2022 budget request.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Mortar System & Fire Control Modernization	5.554	1.358	-
<b>Description:</b> Mortar Systems and Fire Control Modernization initiatives include development and demonstration of new technologies to validate production potential for future mortar systems; including remote turrets and new weapon system components, modernized lightweight pointing device, updated Line Replaceable Units (LRUs), streamlined digital communications, and updated mortar fire control software.			
<b>FY 2021 Plans:</b> FY 2021 funds continue the support development and prototyping of new mortar weapon system and mortar fire control system technologies.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in funding from FY 2021 to FY 2022 due to the completion of Mortar System & Fire Control Modernization efforts.			
<b>Accomplishments/Planned Programs Subtotals</b>	5.554	1.358	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	Total Cost
			Base	OCO	Total					Complete	
• AD9300: Mortar Fire Control Systems Modifications	10.000	7.292	2.830	-	2.830	-	-	-	-	-	-
• K99200: Computer Ballistics: LHMBBC XM32	4.474	7.789	2.811	-	2.811	-	-	-	-	-	-
• K99300: Mortar Fire Control System	28.538	17.472	17.236	-	17.236	-	-	-	-	-	-
• G02200: Mortar Systems	33.026	20.748	37.485	-	37.485	-	-	-	-	-	-
• G02100: Mortar Modification	1.693	1.689	-	-	-	-	-	-	-	-	-

**Remarks**

Other Procurement, Army (OPA) Funding / Procurement of Weapons & Tracked Combat Vehicle (W&TCV)

**D. Acquisition Strategy**

The Mortar System and Fire Control Modernization strategy is using the Department of Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives for hardware and software development during Engineering Manufacturing Design Phase. A new Federal Acquisition Regulation (FAR) based contract will be awarded to complete full rate production.



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS
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<b>Management Services (\$ 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			
Mortar System & Fire Control Modernization - Project Manager Office Support	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.178	0.034	Nov 2019	0.050	Nov 2020	-		-		-	0.000	0.262	-
<b>Subtotal</b>			0.178	0.034		0.050		-		-		-	0.000	0.262	N/A

**Remarks**  
Program management includes travel and documentation support.

<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			
Mortar System & Fire Control Modernization - Fire Control Common Pointing	MIPR	DoD Ordnance Technology Consortium (DOTC) - Inertial Labs : Paeonian Springs, VA	2.194	2.033	Jun 2020	-		-		-		-	0.000	4.227	-
Mortar System & Fire Control Modernization - Fire Control Common Pointing	MIPR	DoD Ordnance Technology Consortium (DOTC) - TBD : TBD	-	-		1.183	Mar 2021	-		-		-	0.000	1.183	-
<b>Subtotal</b>			2.194	2.033		1.183		-		-		-	0.000	5.410	N/A

<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			
Mortar System & Fire Control Modernization - Fire Control Eng Support	MIPR	Combat Capabilities Development Command	1.793	0.677	Sep 2020	-		-		-		-	0.000	2.470	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> 613 / <i>MORTAR SYSTEMS</i>
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<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			
		Armaments Center (CCDC AC) : Picatinny Arsenal, NJ													
Mortar System & Fire Control Modernization - Turreted Mortar Eng Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	-	0.739	Mar 2020	0.125	Nov 2020	-		-		-	0.000	0.864	-
Mortar System & Fire Control Modernization - Turreted Mortar Eng Support	MIPR	Combat Capabilities Development Command Ground Vehicle Systems Center (CCDC GVSC) : Warren, MI	-	0.160	May 2020	-		-		-		-	0.000	0.160	-
Mortar System & Fire Control Modernization - Turreted Mortar FCT Compatibility	MIPR	United States Army Capabilities Integration Center (ARCIC) - Manuever Battle Lab : Fort Eustis, VA	-	1.000	Aug 2020	-		-		-		-	0.000	1.000	-
<b>Subtotal</b>			1.793	2.576		0.125		-		-		-	0.000	4.494	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			
Mortar System & Fire Control Modernization - Turreted Mortar FCT Compatibility	TBD	Yuma Proving Ground : Yuma, AZ	-	0.911	May 2020	-		-		-		-	0.000	0.911	-
<b>Subtotal</b>			-	0.911		-		-		-		-	0.000	0.911	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> 613 / MORTAR SYSTEMS

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
<b>Mortar System and Fire Control Modernization (MS&amp;FCM)</b>																												
MS&FCM- Engineering & Manufacturing Development (EMD)	EMD Preliminary & Detailed Design																											
MS&FCM - LRU Software Development	LRU Software Dev																											
MS&FCM- System Architecture Development (Sys Eng Phase 1)	Sys Architecture Dev (Sys Eng Phase 1)																											
MS&FCM- Preliminary Design Review (PDR)	<div style="text-align: center;">                       2                      PDR                 </div>																											
MS&FCM- EMD Detailed Design Testing (Sys Eng Phase 2)	<div style="text-align: center;">                       3                      CDR                 </div>																											
MS&FCM- Critical Design Review (CDR)																												
MS&FCM-Fire Control Software Development	Fire Control Software Dev																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> 613 / <i>MORTAR SYSTEMS</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mortar System and Fire Control Modernization (MS&FCM)	1	2020	1	2020
MS&FCM- Engineering & Manufacturing Development (EMD)	1	2020	4	2021
MS&FCM - LRU Software Development	1	2020	4	2021
MS&FCM- System Architecture Development (Sys Eng Phase 1)	1	2020	1	2021
MS&FCM- Preliminary Design Review (PDR)	1	2021	1	2021
MS&FCM- EMD Detailed Design Testing (Sys Eng Phase 2)	2	2021	4	2021
MS&FCM- Critical Design Review (CDR)	4	2021	4	2021
MS&FCM-Fire Control Software Development	1	2025	4	2025

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654			
<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>
BQ3: 155mm Artillery Propulsion XM654	-	-	-	34.461	-	34.461	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2022, Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition.  
This Project is not a New Start.

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

Supercharge is a stand-alone top-zone 155 millimeter (mm) propelling charge required to achieve maximum range requirements from the XM1299 Increased Range (formerly Increment 1C) and XM1299A1 Increased Rate of Fire (formerly Increment 2) Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). It will achieve lethality overmatch out to 70 kilometers (km) with developmental extended range projectiles, and will potentially increase range with compatible legacy projectiles up to thirty percent. Supercharge is composed of an earlier bag variant and later combustible cartridge case (foamed celluloid or felted fiber technology), integral metal Stub Case, electrically initiated primer, and advanced artillery propellant. Fiscal Year (FY) 2022 funding will support efforts for aforementioned two parallel Supercharge variants (bag and cased) to support the concurrent development of ERCA Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with automated loading system. This project supports Bag Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of XM1299 ERCA Increased Range to perform Operational Assessment. This project also supports concurrent engineering, manufacturing development of the Cased Supercharge for future fielding with ERCA IRF. These efforts directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> 155mm Artillery Propulsion Supercharge	-	-	34.461
<b>Description:</b> Unitary top-zone propelling charge for XM907E2 Extended Range Cannon with Slide-block breech for use with Extended Range Cannon Artillery (ERCA) Increased Range and ERCA Increased Rate of Fire to gain range overmatch for 155mm artillery.			
<b>FY 2022 Plans:</b> Fiscal Year (FY) 2022 funding will support efforts for two parallel Supercharge variants (bag and cased) to support the concurrent development of ERCA Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with automated loading system. This project supports Bag Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA IR to			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
perform Operational Assessment. This project also supports concurrent engineering, manufacturing development of the Cased Supercharge for future fielding with ERCA IRF.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY 2022 transition from Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition, Project BQ4, 155mm Artillery Propulsion. FY 2022 increase required to support multiple, high quantity test events to qualify Bag Supercharge for ERCA IR, and continue concurrent development of Cased Supercharge for future fielding with ERCA IRF.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	34.461

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• BQ4: 155mm Artillery Propulsion XM654	6.904	15.131	-	-	-	-	-	-	-	-	-
• E99350: 155mm Artillery Supercharge XM654	-	-	3.151	-	3.151	-	-	-	-	-	-

**Remarks**  
In FY 2022, Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition.

A Procurement of Ammunition, Army (PAA) budget line item, Standard Study Number (SSN) E99350, will resource procurement of the Bag Supercharge variant to deliver Safety Release quantities for First Unit Issued (FUI) to support Extended Range Cannon Artillery (ERCA) Increased Range (IR) Operational Assessment as well as future Urgent Materiel Release (UMR) and Full Materiel Release (FMR) quantities. This SSN will also resource future procurement of the Cased Supercharge.

**D. Acquisition Strategy**  
The Supercharge Project will consist of critical technology prototyping, testing, and demonstration of two variants: (1) the Supercharge 2-piece Bag configuration, to support the acceleration of the XM1299 Extended Range Cannon Artillery (ERCA) Increased Range (IR) to achieve lethality at 70km and greater with precision accuracy in FY 2023, and (2) the Supercharge Cased to support ERCA Increased Rate of Fire (IRF) with added automated loading system based on the outcome of ERCA IRF prototyping efforts. The Project will utilize the Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) for the integration of components such as propellant, combustible case, igniter and stub case.

In FY 2022, the Supercharge 2-piece Bag variant will initiate qualification testing and transition to procurement of quantities required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA IR that will perform Operational Assessment. Federal Acquisition Regulation (FAR) based production contract(s) will be awarded for Urgent Materiel Release (UMR) and Full Materiel Release (FMR).

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> BQ3 / <i>155mm Artillery Propulsion XM654</i>

The Cased Supercharge will require additional technology maturation, system integration, developmental testing and qualification for UMR to support ERCA IRF. FAR based production contract(s) will be awarded for FMR.



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654
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<b>Management Services (\$ 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			
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	-	-		-		0.143	Oct 2021	-		0.143	0.000	0.143	-
<b>Subtotal</b>			-	-		-		0.143		-		0.143	0.000	0.143	N/A

<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			
Combustible Case Components	MIPR	DoD Ordnance Technology Consortium (DOTC): Armtec : Coachella, CA	-	-		-		10.250	Nov 2021	-		10.250	0.000	10.250	-
Main Charge Propellants	MIPR	DoD Ordnance Technology Consortium (DOTC): General Dynamics Ordnance and Tactical Systems - Valleyfield : Salaberry-de-Valleyfield, Quebec, Canada	-	-		-		4.700	Nov 2021	-		4.700	0.000	4.700	-
Main Load Assemble & Pack	MIPR	DoD Ordnance Technology Consortium (DOTC): General Dynamics Ordnance and Tactical Systems - Marion, IL : Marion, IL	-	-		-		1.850	Nov 2021	-		1.850	0.000	1.850	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654
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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			
Foamed Celluloid Case	MIPR	DoD Ordnance Technology Consortium (DOTC): TBS : TBS	-	-		-		3.500	Mar 2022	-		3.500	0.000	3.500	-
Projectile and Fuze Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC): TBS : TBS	-	-		-		5.390	Nov 2021	-		5.390	0.000	5.390	-
<b>Subtotal</b>			-	-		-		25.690		-		25.690	0.000	25.690	N/A

<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			
Engineering Support	MIPR	US Army Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		-		5.828	Nov 2021	-		5.828	0.000	5.828	-
<b>Subtotal</b>			-	-		-		5.828		-		5.828	0.000	5.828	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			
Bag Supercharge Qualification	MIPR	Army Test & Evaluation Command (ATEC): Yuma Proving Ground : Yuma, AZ	-	-		-		1.800	Nov 2021	-		1.800	0.000	1.800	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654
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<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Cased Supercharge Qualification	MIPR	Army Test & Evaluation Command (ATEC): Yuma Proving Ground : Yuma, AZ	-	-		-		1.000	May 2022	-		1.000	0.000	1.000	-
<b>Subtotal</b>			-	-		-		2.800		-		2.800	0.000	2.800	N/A

<b>Project Cost Totals</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>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	-	-	0.000	34.461	-	34.461	0.000	34.461	N/A

**Remarks**  
Project funding increases in FY 2022 since Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654

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																												
<b>Supercharge 2-piece Bag</b>																																																								
Bag Preliminary Design Review (PDR)																													▲ 1 PDR																											
Bag Prototype Development & Testing																													■ Prototype Development & Testing																											
Bag Qualification Testing - Safety Release																													■ Qualification Testing																											
Bag Critical Design Review (CDR)																													▲ 4 CDR																											
Bag Safety Release Decision Point (DP) / Contract Award																													▲ 5 Safety Release DP / Award																											
Bag Deliveries for ERCA Operational Assessment (OA)																													■ Bag Deliveries for ERCA OA																											
Bag Safety Release for ERCA FUI																													▲ 7 Safety Release for ERCA FUI																											
ERCA Increased Range (IR) FUI																													▲ 8 ERCA IR FUI																											
ERCA System of Systems (SoS) OA																													■ ERCA SoS OA																											
Bag Urgent Materiel Release (UMR)																													▲ 10 UMR																											
<b>Supercharge Cased</b>																																																								
Cased Development																																																								

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> BQ3 / <i>155mm Artillery Propulsion XM654</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
Cased PDR													6 PDR															
Cased Prototype Development & Testing													9 CDR															
Cased CDR													9 CDR															
Cased Qualification Testing													9 CDR															

**Note**  
In FY 2022, Project BQ3 will transition from Project BQ4, 155mm Artillery Propulsion, within the Budget Activity 04, Program Element (PE) 0603639A, Tank and Medium Caliber Ammunition, where concurrent design risk reduction and prototype maturation efforts were completed.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> BQ3 / <i>155mm Artillery Propulsion XM654</i>

Schedule reflects Engineering and Manufacturing Development (EMD) efforts for two parallel Supercharge variants (2-piece bag and cased) required to support the concurrent development of the Extended Range Cannon Artillery (ERCA) Increased Range (IR) and ERCA Increased Rate of Fire (IRF) with added automated loading system.

Bag Supercharge is pursuing a Safety Release to support ERCA IR System of Systems Operational Assessment. Follow-on Urgent Materiel Release(s) and Full Materiel Release (FMR) of the Bag Supercharge will be fielded to support the ERCA weapon system and projectiles. All Safety Release, UMR and FMR quantities will be procured with the associated Procurement of Ammunition, Army (PAA) funding.

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BQ3 / 155mm Artillery Propulsion XM654

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Supercharge 2-piece Bag	1	2022	1	2022
Bag Preliminary Design Review (PDR)	1	2021	1	2021
Bag Prototype Development & Testing	1	2021	4	2021
Bag Qualification Testing - Safety Release	1	2022	2	2023
Bag Critical Design Review (CDR)	2	2022	2	2022
Bag Safety Release Decision Point (DP) / Contract Award	4	2022	4	2022
Bag Deliveries for ERCA Operational Assessment (OA)	4	2023	4	2023
Bag Safety Release for ERCA FUI	4	2023	4	2023
ERCA Increased Range (IR) FUI	4	2023	4	2023
ERCA System of Systems (SoS) OA	1	2024	4	2024
Bag Urgent Materiel Release (UMR)	4	2024	4	2024
Supercharge Cased	1	2022	1	2022
Cased Development	1	2022	2	2023
Cased PDR	2	2023	2	2023
Cased Prototype Development & Testing	2	2023	2	2024
Cased CDR	2	2024	2	2024
Cased Qualification Testing	2	2024	3	2025

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition			
<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>
BY1: Next Generation Combat Vehicle Ammunition	-	-	22.176	33.867	-	33.867	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

50x228 millimeter (mm) family of ammunition is a critical technology development in response to the Next Generation Combat Vehicle (NGCV) Abbreviated Capability Development Document for weapon qualification, platform integration, and fielding of the Optionally Manned Fighting Vehicle (OMFV) primary weapon system (XM913). This effort includes the development of three capabilities: The XM1202 Target Practice with Trace (TP-T); the XM1203 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T); and the XM1204 High Explosive Airburst with Trace (HEAB-T). The training cartridge will allow the Warfighter to train in a cost effective manner and the tactical cartridges will provide enhanced lethality at increased ranges when engaging personnel threats in the open, defilade, and under the cover of urban structures, Anti-Tank Guided Missiles (ATGM) teams, and current and projected future peer armored materiel threats. This effort is operating under Middle Tier Acquisition authority for rapid prototyping to qualify the three munitions in order to support the NGCV Cross Functional Team (CFT) timeline for First Unit Equipped (FUE). Fiscal Year (FY) 2022 funding will support Design Engineering Tests (DET) to confirm TP-T and APFSDS-T safety, performance, and ruggedness as well as the assessment of HEAB-T fuze safety and function.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> 50x228mm Ammunition Development	-	22.176	33.867
<b>Description:</b> Qualify 50mm Target Practice with Trace (TP-T), Armor Piercing Fin-Stabilized Discarding Sabot with Trace (APFSDS-T), and High Explosive Airburst with Trace (HEAB-T) ammunition through the rapid prototyping phase.			
<b>FY 2021 Plans:</b> Funding will be used to support the continued development of TP-T, APFSDS-T, and HEAB-T ammunition. In addition, the funding will also be used to support Design Engineering Testing (DET) and hardware build for Developmental Test & Evaluation (DT&E) for each of the three 50mm cartridges.			
<b>FY 2022 Plans:</b> Funding will support DET for all three cartridge types and subsequent design optimization. The TP-T and APFSDS-T cartridges will undergo Critical Design Review (CDR) and subsequent component procurement and cartridge assembly for Developmental Test & Evaluation (DT&E). HEAB-T fuze testing will lead to design maturation and components procurement for follow-on tests.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2022 funding increased to support design optimization efforts, three Design Engineering Tests, DT&E hardware materials procurement and cartridge assembly.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	22.176	33.867

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

<b>Line Item</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>
• E80011: Next Generation Combat Vehicle Ammunition	-	-	-	-	-	-	-	-	-		

**Remarks**

**D. Acquisition Strategy**  
 Department of Defense Ordnance and Technology Consortium (DOTC) Other Transaction Agreements (OTAs) will be used for rapid prototyping on the three 50 x 228mm ammunition variants: TP-T, APFSDS-T, and HEAB-T. This will consist of Design Engineering Testing (DET), technical reviews, and Developmental Test and Evaluation (DT&E). For APFSDS-T, one contractor is awarded and will complete the rapid prototyping process. For TP-T two contractors are awarded and will complete rapid prototyping process. For HEAB-T, two contractors are awarded rapid prototyping agreements and a down selection decision will be made in FY 2023; then one HEAB-T contractor will complete the rapid prototyping process. The DOTC agreements will conclude upon achieving Milestone C for each cartridge: TP-T and APFSDS-T in FY 2024; and HEAB-T in FY 2025.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition
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<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
50x228mm APFSDS-T Ammunition Development & Test Evaluation Hardware Contract	C/CPFF	General Dynamics Ordnance and Tactical Systems (GDOTS) : Marion, Illinois	-	-		2.000	Mar 2021	5.658	May 2022	-		5.658	Continuing	Continuing	Continuing
50x228mm TP-T Ammunition Development & Test Evaluation Hardware Contract	C/CPFF	General Dynamics Ordnance and Tactical Systems : Marion, Illinois	-	-		1.000	Mar 2021	2.194	Mar 2022	-		2.194	Continuing	Continuing	Continuing
50x228mm TP-T Ammunition Development & Test Evaluation Hardware Contract	C/CPFF	Northrop Grumman Innovation Systems (NGIS) : Plymouth, MN	-	-		1.000	Mar 2021	2.194	Mar 2022	-		2.194	Continuing	Continuing	Continuing
50x228mm HEAB-T Ammunition Design Engineering Test Hardware Contract	C/CPFF	General Dynamics Ordnance and Tactical Systems : Marion, Illinois	-	-		5.989	Mar 2021	9.621	Jan 2022	-		9.621	Continuing	Continuing	Continuing
50x228mm HEAB-T Ammunition Design Engineering Test Hardware Contract	C/CPFF	Northrop Grumman Innovation Systems (NGIS) : Plymouth, MN	-	-		5.989	Mar 2021	9.621	Jan 2022	-		9.621	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		15.978		29.288		-		29.288	Continuing	Continuing	N/A

<b>Support (\$ 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
50x228mm Ammo Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny, NJ	-	-		2.498	Dec 2020	3.080	Dec 2021	-		3.080	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		2.498		3.080		-		3.080	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 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition							
<b>Test and Evaluation (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
50x228mm Design Engineering Testing	MIPR	Aberdeen Proving Ground (APG) : Aberdeen, MD	-	-		3.700	Jan 2021	1.499	Dec 2021	-		1.499	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		3.700		1.499		-		1.499	Continuing	Continuing	N/A
			<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>
<b>Project Cost Totals</b>			-	-		22.176		33.867		-		33.867	Continuing	Continuing	N/A
<b>Remarks</b>															

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition

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
50mm TP-T Rapid Prototyping Award					▲ 2	50mm TP-T Award																						
50mm TP-T Rapid Prototyping					50mm TP-T Rapid Prototyping																							
50mm TP-T Design Engineering Test (DET) Build					50mm TP-T DET Build																							
50mm TP-T Design Engineering Test (DET)					50mm TP-T DET																							
50mm TP-T Critical Design Review (CDR)					50mm TP-T CDR																							
50mm TP-T Development Test & Evaluation (DT&E) Build					50mm TP-T DT&E Build																							
50mm TP-T Development Test & Evaluation (DT&E)					50mm TP-T DT&E																							
50mm TP-T Milestone C					50mm TP-T MS-C																							
50mm TP-T Prototype Fielding					50mm TP-T Prototype Fielding																							
50mm APFSDS-T Rapid Prototyping Award									▲ 3	50mm APFSDS-T Award																		
50mm APFSDS-T Rapid Prototyping									50mm APFSDS-T Rapid Prototyping																			
50mm APFSDS-T Design Engineering Test (DET) Build									50mm APFSDS-T DET Build																			
50mm APFSDS-T Design Engineering Testing (DET)									50mm APFSDS-T DET																			
50mm APFSDS-T Design Engineering Test (DET) Build									50mm APFSDS-T DET Build																			

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition

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
50mm APFSDS-T Critical Design Review (CDR)									5 50mm APFSDS-T CDR																			
50mm APFSDS-T Development Test & Evaluation (DT&E) Build									50mm APFSDS-T DT&E Build																			
50mm APFSDS-T Development Test & Evaluation (DT&E)													50mm APFSDS-T DT&E															
50mm APFSDS-T Milestone C																	8 50mm APFSDS-T MS-C											
50mm APFSDS-T Prototype Fielding																	50mm APFSDS-T Prototype Fielding											
50mm HEAB-T Rapid Prototyping Award	1 50mm HEAB-T Award																											
50mm HEAB-T Rapid Prototyping									50mm HEAB-T Rapid Prototyping																			
50mm HEAB-T Design Engineering Testing 1 (DET 1) Build									50mm HEAB-T DET 1 Build																			
50mm HEAB-T Design Engineering Testing 1 (DET 1)									50mm HEAB-T DET 1																			
50mm HEAB-T Design Engineering Testing 2 (DET 2) Build									50mm HEAB-T DET 2 Build																			
50mm HEAB-T Design Engineering Testing 2 (DET 2)													50mm HEAB-T DET 2															
50mm HEAB-T Critical Design Review (CDR)													6 50mm HEAB-T CDR															
50mm HEAB-T Development Test & Evaluation (DT&E) Build																	50mm HEAB-T DT&E Build											



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> BY1 / <i>Next Generation Combat Vehicle Ammunition</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
50mm TP-T Rapid Prototyping Award	1	2021	1	2021
50mm TP-T Rapid Prototyping	1	2021	2	2024
50mm TP-T Design Engineering Test (DET) Build	3	2021	1	2022
50mm TP-T Design Engineering Test (DET)	1	2022	2	2022
50mm TP-T Critical Design Review (CDR)	2	2022	2	2022
50mm TP-T Development Test & Evaluation (DT&E) Build	2	2022	1	2023
50mm TP-T Development Test & Evaluation (DT&E)	2	2023	3	2023
50mm TP-T Milestone C	2	2024	2	2024
50mm TP-T Prototype Fielding	2	2024	4	2025
50mm APFSDS-T Rapid Prototyping Award	2	2021	2	2021
50mm APFSDS-T Rapid Prototyping	2	2021	3	2024
50mm APFSDS-T Design Engineering Test (DET) Build	3	2021	2	2022
50mm APFSDS-T Design Engineering Testing (DET)	2	2022	3	2022
50mm APFSDS-T Critical Design Review (CDR)	3	2022	3	2022
50mm APFSDS-T Development Test & Evaluation (DT&E) Build	3	2022	3	2023
50mm APFSDS-T Development Test & Evaluation (DT&E)	3	2023	4	2023
50mm APFSDS-T Milestone C	3	2024	3	2024
50mm APFSDS-T Prototype Fielding	3	2024	1	2026
50mm HEAB-T Rapid Prototyping Award	4	2020	4	2020
50mm HEAB-T Rapid Prototyping	4	2020	3	2025
50mm HEAB-T Design Engineering Testing 1 (DET 1) Build	4	2021	2	2022
50mm HEAB-T Design Engineering Testing 1 (DET 1)	3	2022	3	2022

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> BY1 / Next Generation Combat Vehicle Ammunition
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Events	Start		End	
	Quarter	Year	Quarter	Year
50mm HEAB-T Design Engineering Testing 2 (DET 2) Build	3	2022	2	2023
50mm HEAB-T Design Engineering Testing 2 (DET 2)	2	2023	3	2023
50mm HEAB-T Critical Design Review (CDR)	4	2023	4	2023
50mm HEAB-T Development Test & Evaluation (DT&E) Build	1	2024	4	2024
50mm HEAB-T Development Test & Evaluation (DT&E)	4	2024	2	2025
50mm HEAB-T Milestone C	4	2025	4	2025
50mm HEAB-T Prototype Fielding	4	2025	1	2027

**Note**

Notes:  
 Target Practice with Trace (TP-T)  
 Armor-Piercing Fin-Stabilized Discarding Sabot with Trace (APFSDS-T)  
 High Explosive Airburst with trace (HEAB-T)



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> CE3 / Precision Munition (Sniper)
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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
CE3: Precision Munition (Sniper)	-	-	-	9.275	-	9.275	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

This is a new start in FY 2022.

Project CE3 / Precision Munition (Sniper) is a New Start in Fiscal Year (FY) 2022.

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

The Precision Munition (Sniper) project is a critical technology development in response to the Precision Munition Capabilities Development Documents (CDD) for the ammunition required to support the Precision Sniper Rifle (PSR) / sniper weapons systems. The objective is to transfer the latest lethality technology into the suite of ammunition used by snipers. The Precision Munition improvement is split into three capability areas: Anti-Materiel (AM), Improved Performance Round (IPR), and Subsonic. The AM and IPR capabilities will enhance lethal effects at greater distances. The Subsonic capability will increase soldier survivability at close range by providing a low-sound signature munition that is undetectable to the enemy. Fiscal Year (FY) 2022 funding supports rapid development of the AM munitions and evaluation of ammunition prototypes/concepts. FY 2022 also supports rapid development of the IPR munitions by manufacturing and maturing prototype designs. And, FY 2022 supports evaluating and maturing industry Subsonic munitions solutions and conducting safety testing.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Develop and Improve Ammunition for Sniper Weapons Systems.	-	-	9.275
<b>Description:</b> Develop, demonstrate, and qualify new sniper ammunition to defeat hard targets for the Precision Sniper Rifle (PSR) and other sniper weapons systems. Integrate latest lethality technology into the current suite of sniper ammunition for the Precision Sniper Rifle (PSR) and other sniper weapons systems. Integrate latest lethality technology into the current subsonic ammunition for the Precision Sniper Rifle (PSR) and other sniper weapons systems.			
<b>FY 2022 Plans:</b> Commence rapid development of the AM munitions; manufacture and evaluate prototype ammunition concepts. Commence rapid development of the IPR munitions; manufacture and mature prototype ammunition designs. Evaluate and mature industry Subsonic Munitions prototype solutions and conduct safety testing.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Project is a new start in FY 2022.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	9.275

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> CE3 / <i>Precision Munition (Sniper)</i>

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

**Remarks**

**D. Acquisition Strategy**

The Precision Munition (Sniper) will utilize the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding to develop ammunition concepts/designs for the AM capability and the IPR capability using Government/Industry developed designs. The Subsonic capability will be satisfied by utilizing Other Transaction Authority (OTA) to acquire and/or mature current industry designs. All three capabilities will be satisfied via competitive contracts to multiple vendors.

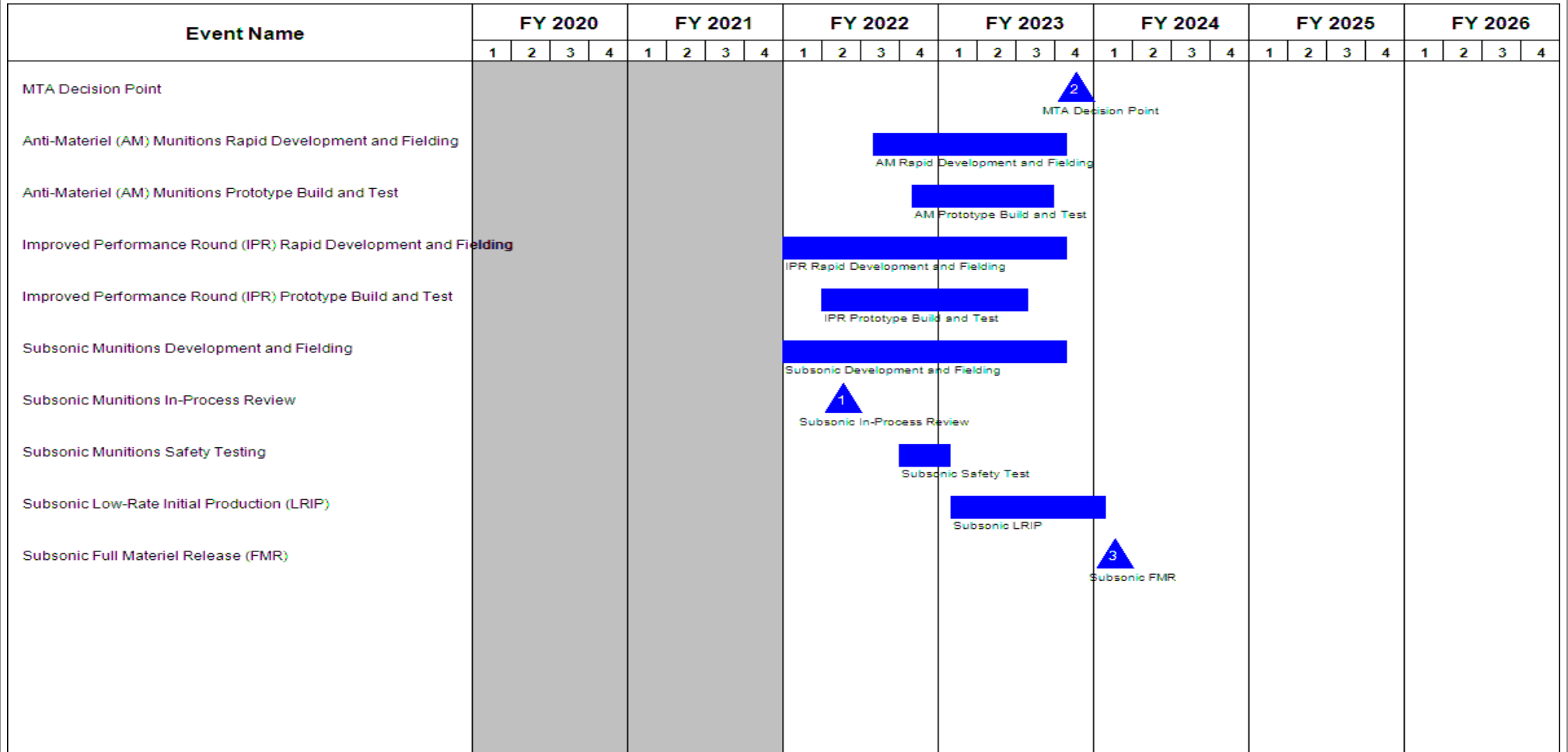
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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				CE3 / Precision Munition (Sniper)							
<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
Anti-Materiel Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		-		0.750	Jun 2022	-		0.750	Continuing	Continuing	Continuing
Improved Performance Round Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		-		2.250	Jan 2022	-		2.250	Continuing	Continuing	Continuing
Subsonic Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		-		2.500	Jan 2022	-		2.500	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		-		5.500		-		5.500	Continuing	Continuing	N/A
<b>Support (\$ 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
Anti-Materiel Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.500	May 2022	-		0.500	Continuing	Continuing	Continuing
Improved Performance Round Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.967	Oct 2021	-		0.967	Continuing	Continuing	Continuing
Subsonic Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		1.808	Oct 2021	-		1.808	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		-		3.275		-		3.275	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 Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Lethality Testing and Analysis	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.500	Jan 2022	-		0.500	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	-		-		0.500		-		0.500	Continuing	Continuing	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> CE3 / Precision Munition (Sniper)



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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> CE3 / Precision Munition (Sniper)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MTA Decision Point	4	2023	4	2023
Anti-Materiel (AM) Munitions Rapid Development and Fielding	3	2022	4	2023
Anti-Materiel (AM) Munitions Prototype Build and Test	4	2022	3	2023
Improved Performance Round (IPR) Rapid Development and Fielding	1	2022	4	2023
Improved Performance Round (IPR) Prototype Build and Test	2	2022	3	2023
Subsonic Munitions Development and Fielding	1	2022	4	2023
Subsonic Munitions In-Process Review	2	2022	2	2022
Subsonic Munitions Safety Testing	4	2022	1	2023
Subsonic Low-Rate Initial Production (LRIP)	1	2023	1	2024
Subsonic Full Materiel Release (FMR)	1	2024	1	2024

**Note**

Middle Tier of Acquisition (MTA)

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions			
<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>
EC4: Non-Standard Simulator Munitions	-	2.536	2.154	2.116	-	2.116	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project EC4 Non-Standard Simulator Munitions will standardize various pyrotechnics that simulate battlefield effects. The Army's Combat Training Centers (CTCs) are currently using non-standard munitions to replicate both conventional and asymmetric warfare battlefield effects. These modified commercial-off-the-shelf products have not been type classified or material released and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/simulators to replicate both conventional and asymmetric warfare battlefield effects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Mini Blast to simulate hostile fire and small Improvised Explosive Devices (IEDs) during mounted operations in urban terrain; Micro pyrotechnics to simulate indoor hostile fire and IED effects that are capable of being integrated into existing facilities; Rocket Propelled Grenade (RPG) simulators to replicate the flight of a Rocket Propelled Grenade; High Order Blast Effect (HiOBE) used to replicate a Vehicle Borne Improvised Explosive Device (VBIED), building explosions, and other significant explosive events; Artillery airburst simulator to replicate indirect fire; simulator to replicate a STINGER firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems and mitigate environmental concerns and safety risks associated with realistic scenario based training. FY 2022 funding will support the development of Yellow Smoke, RPG on a wire, Mini Blast, Tracer, HiOBE, and Micro pyrotechnic simulators.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Standardize Special Use Ammunition	2.536	2.154	2.116
<b>Description:</b> Standardize non-standard pyrotechnic battlefield effects currently used by CTCs.			
<b>FY 2021 Plans:</b> This project continues the technical data validation and transition documentation for Artillery Airburst and Black Smoke as well as technology development and maturation for the Yellow Smoke, RPG on a Wire, and Mini Blast Pyrotechnics.			
<b>FY 2022 Plans:</b> This project will support Engineering and Manufacturing Development (EMD) activities for Yellow Smoke, RPG on a Wire, and Mini Blast pyrotechnics and will begin technology maturation support for the Tracer and High Order Blast Effect (HiOBE) simulators.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding is required to continue the development and maturation of the suite of special use simulators.			
<b>Accomplishments/Planned Programs Subtotals</b>	2.536	2.154	2.116

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• E88404: <i>SIMULATORS, Non-Standard, Special Effects, f/CTCs</i>	-	1.748	0.108	-	0.108	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Acquisition strategy is to incrementally develop and field a family of special use ammunition. Initial special use ammunition to be fielded will be the Artillery Airburst/Stinger, and Black Smoke simulators followed by additional training simulators as required in the Future Army System of Integrated Targets (FASIT) Capability Production Document (CPD).



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions
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<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
RPG/Mini Blast Prototype Build	C/FFP	TBD : TBD	-	-		0.533	Jun 2021	-		-		-	0.000	0.533	-
Yellow Smoke Qualification Hardware	C/FFP	TBD : TBD	-	-		0.445	Jul 2021	-		-		-	0.000	0.445	-
Plastic Mold Development	C/FFP	TBD : TBD	-	-		0.280	May 2021	-		-		-	0.000	0.280	-
Product Development	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	2.520	0.986	Nov 2020	-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			2.520	0.986		1.258		-		-		-	Continuing	Continuing	N/A

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	2.265	1.526	Mar 2020	0.404	Mar 2021	1.081	Oct 2021	-		1.081	Continuing	Continuing	-
EOD Publication Support	MIPR	Naval Surface Warfare Center : Indian Head, MD	-	-		0.042	Apr 2021	-		-		-	0.000	0.042	-
Engineering Support	MIPR	DEVCOM Data and Analysis Center (DAC) : Aberdeen Proving Ground, MD	-	0.024	Sep 2020	-		-		-		-	0.000	0.024	-
<b>Subtotal</b>			2.265	1.550		0.446		1.081		-		1.081	Continuing	Continuing	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions

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	
<b>Artillery Airburst and Stinger</b>																													
Artillery Airburst and Stinger Tech Data Validation	[Redacted]																												
	Artillery & Stinger Tech Validation																												
Artillery and Stinger Type Classification									6																				
									Artillery & Stinger TC																				
Artillery and Stinger Production	[Redacted]																												
	Artillery & Stinger Production																												
<b>Black Smoke</b>																													
Black Smoke Technology Development and Maturation	[Redacted]																												
	Black Smoke Tech Dev and Maturation																												
Black Smoke Milestone C									7																				
									Black Smoke MS-C																				
Black Smoke Production	[Redacted]																												
	Black Smoke Production																												
<b>Yellow Smoke</b>																													
Yellow Smoke Technology Development	[Redacted]																												
	Yellow Smoke Tech Development																												
Yellow Smoke Milestone B									8																				
									Yellow Smoke MS-B																				
Yellow Smoke Engineering and Manufacturing Development									[Redacted]																				
									Yellow Smoke EMD																				
Yellow Smoke Milestone C																	15												
																	Yellow Smoke MS-C												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions

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
Yellow Smoke Production	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
RPG													[Redacted]				[Redacted]				[Redacted]				[Redacted]			
RPG Technology Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
RPG Milestone B	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
RPG Engineering and Manufacturing Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
RPG Milestone C	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
RPG Production	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mini Blast	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mini Blast Technology Development													[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mini Blast Milestone B	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mini Blast Engineering and Manufacturing Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mini Blast Milestone C	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Mini Blast Production	[Redacted]				[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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions

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																								
<b>Tracer</b>																																																				
Tracer Technology Development																																																				
Tracer Milestone B																													13				Tracer MS-B																			
Tracer Engineering and Manufacturing Development																																																				
Tracer Milestone C																													20				Tracer MS-C																			
Tracer Production																																																				
<b>High Order Blast Effect (HiOBE)</b>																																																				
HiOBE Technology Development																																																				
HiOBE Milestone B	14				HiOBE MS-B																																															
HiOBE Engineering and Manufacturing Development																																																				
HiOBE Milestone C	21				HiOBE MS-C																																															
HiOBE Production																																																				
<b>Micro Pyro</b>																																																				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions

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
Micro Pyro Technology Development													Micro Pyro Tech Development															
Micro Pyro Milestone B																					▲ 19 Micro Pyro MS-B							
Micro Pyro Engineering and Manufacturing Development																	Micro Pyro EMD											
Micro Pyro Milestone C																					▲ 22 Micro Pyro MS-C							
Micro Pyro Production																									Micro Pyro Production			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EC4 / <i>Non-Standard Simulator Munitions</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Artillery Airburst and Stinger	4	2020	4	2020
Artillery Airburst and Stinger Tech Data Validation	4	2019	4	2021
Artillery and Stinger Type Classification	4	2021	4	2021
Artillery and Stinger Production	4	2021	4	2028
Black Smoke	4	2020	4	2020
Black Smoke Technology Development and Maturation	4	2019	4	2021
Black Smoke Milestone C	4	2021	4	2021
Black Smoke Production	4	2021	4	2027
Yellow Smoke	4	2020	4	2020
Yellow Smoke Technology Development	2	2020	1	2022
Yellow Smoke Milestone B	1	2022	1	2022
Yellow Smoke Engineering and Manufacturing Development	1	2022	2	2023
Yellow Smoke Milestone C	2	2023	2	2023
Yellow Smoke Production	2	2023	4	2027
RPG	4	2020	4	2020
RPG Technology Development	2	2020	1	2022
RPG Milestone B	1	2022	1	2022
RPG Engineering and Manufacturing Development	1	2022	2	2023
RPG Milestone C	2	2023	2	2023
RPG Production	2	2023	4	2027
Mini Blast	4	2020	4	2020
Mini Blast Technology Development	2	2020	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EC4 / Non-Standard Simulator Munitions
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Events	Start		End	
	Quarter	Year	Quarter	Year
Mini Blast Milestone B	1	2022	1	2022
Mini Blast Engineering and Manufacturing Development	1	2022	2	2023
Mini Blast Milestone C	2	2023	2	2023
Mini Blast Production	2	2023	4	2027
Tracer	4	2022	4	2022
Tracer Technology Development	1	2022	1	2023
Tracer Milestone B	1	2023	1	2023
Tracer Engineering and Manufacturing Development	1	2023	1	2025
Tracer Milestone C	1	2025	1	2025
Tracer Production	1	2025	1	2031
High Order Blast Effect (HiOBE)	4	2022	4	2022
HiOBE Technology Development	1	2022	1	2023
HiOBE Milestone B	1	2023	1	2023
HiOBE Engineering and Manufacturing Development	1	2023	3	2025
HiOBE Milestone C	3	2025	3	2025
HiOBE Production	3	2025	4	2030
Micro Pyro	1	2024	1	2024
Micro Pyro Technology Development	4	2022	1	2024
Micro Pyro Milestone B	1	2024	1	2024
Micro Pyro Engineering and Manufacturing Development	1	2024	4	2025
Micro Pyro Milestone C	4	2025	4	2025
Micro Pyro Production	1	2026	4	2031



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

<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> ED7 / Advanced Multipurpose (AMP) Cartridge			
<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>
ED7: Advanced Multipurpose (AMP) Cartridge	-	13.520	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The XM1147 Advanced Multi Purpose (AMP) program is a direct fire line of sight 120 millimeter (mm) large caliber munition under development for the Abrams Main Battle Tank. AMP has three modes of operation including point detonate, point detonate delay, and airburst. AMP is the materiel solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50 Meter (m) to 2000m threshold and 50m to 4500m objective, a validated gap that cannot currently be met with existing stockpiled ammunition. In addition to added capability, AMP will also consolidate the capabilities of four existing stockpiled 120mm munitions, thereby addressing the users' battlecarry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including ATGM teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breach modification, the same required by the 120mm M829A4 cartridge that achieved Milestone C in Fiscal Year (FY) 2014 and achieved Full Materiel Release in FY 2015. In FY 2022 there is no funding request.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD) Phase 2	13.520	-	-
<b>Description:</b> Design, develop and test components and cartridges leading to a design freeze. The final design will then be carried forward to Developmental Test and Evaluation (DT&E) qualification testing to demonstrate the cartridge's ability to meet performance requirements prior to production.			
<b>Accomplishments/Planned Programs Subtotals</b>	13.520	-	-

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

<b>Line Item</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>
• E88105: CTG, 120MM TANK, HEMP-T, XM1147	10.000	38.989	23.359	-	23.359	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The XM1147 AMP Program achieved Milestone B and entered EMD in FY 2015. EMD consists of two phases; Phase 1 awarded two contracts in FY 2015 to competitively prototype. A cartridge demonstration test was conducted and was used to support down-select to a single contractor for EMD Phase 2. The Critical

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> ED7 / <i>Advanced Multipurpose (AMP) Cartridge</i>
<p>Design Review (CDR) was successfully conducted in 1Q FY 2020 followed by Developmental Test &amp; Evaluation (DT&amp;E) conducted throughout FY 2020. A successful Milestone C has been achieved in 1Q FY 2021 which has initiated the first of two Low Rate Initial Productions with one optional year of full procurement in FY 2022. Explore options to increase future competition and facilitate effective training.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				ED7 I Advanced Multipurpose (AMP) Cartridge							
Product Development (\$ in Millions)				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
Project Manager Maneuver Ammunition Systems (PM MAS)	Various	Picatinny Arsenal : NJ	5.936	1.062	Dec 2019	-		-		-		-	Continuing	Continuing	Continuing
Engineering Manufacturing & Development Contract	C/CPIF	Northrop Grumman Innovation Systems (NGIS) : Plymouth, MN	86.511	3.237	Nov 2019	-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			92.447	4.299		-		-		-		-	Continuing	Continuing	N/A
Support (\$ in Millions)				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
Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny, NJ	12.521	1.500	Nov 2019	-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			12.521	1.500		-		-		-		-	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
Yuma Test Center	MIPR	Yuma Proving Ground : Yuma, AZ	13.441	6.709	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing
Aberdeen Test Center	MIPR	Aberdeen Proving Ground : Aberdeen, MD	5.136	1.012	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			18.577	7.721		-		-		-		-	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> ED7 / Advanced Multipurpose (AMP) Cartridge

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
Engineering and Manufacturing Development (EMD) Phase II	[Redacted]				[Redacted]																							
Critical Design Review	EMD Phase II				[Redacted]																							
Developmental Test and Evaluation (DT&E)	[Redacted]				[Redacted]																							
Milestone C	[Redacted]				[Redacted]																							
Low Rate Initial Production 1	[Redacted]				[Redacted]																							
Live Fire Test and Evaluation	[Redacted]				[Redacted]																							
Initial Operational Test and Evaluation	[Redacted]				[Redacted]																							
Low Rate Initial Production 2	[Redacted]				[Redacted]																							
Full Rate Production	[Redacted]				[Redacted]																							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> ED7 / <i>Advanced Multipurpose (AMP) Cartridge</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone B	1	2015	1	2015
Engineering and Manufacturing Development (EMD) Contract Phase I Awards	4	2015	4	2015
Engineering and Manufacturing Development (EMD) Phase I	4	2015	2	2017
Preliminary Design Review (PDR)	3	2016	3	2016
EMD Contract Phase II Award / Down-Select	2	2017	2	2017
Engineering and Manufacturing Development (EMD) Phase II	2	2017	4	2020
Critical Design Review	1	2020	1	2020
Developmental Test and Evaluation (DT&E)	2	2020	4	2020
Milestone C	1	2021	1	2021
Low Rate Initial Production 1	1	2021	1	2022
Live Fire Test and Evaluation	4	2021	4	2021
Initial Operational Test and Evaluation	4	2021	4	2021
Low Rate Initial Production 2	3	2021	2	2022
Full Rate Production	3	2022	3	2022
Evaluation for Future Combat Platforms	1	2018	4	2018
Training Round Demonstration	1	2019	3	2019

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EL9 / Ammunitions Logistics Prototyping			
<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>
EL9: Ammunitions Logistics Prototyping	-	2.233	1.639	0.696	-	0.696	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project EL9 Ammunitions Logistics Prototyping supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. Fiscal Year (FY) 2022 funding will be focused on integrating commercial off the shelf and/or relatively mature technologies into ammunition resupply enablers required by the Long Range Precision Fire (LRPF) Cross Functional Team (CFT). They will be focused on ensuring that a low risk resupply process solution exists to support the success of the Extended Range Canon Artillery (ERCA).

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Munitions Survivability and Logistics Enablers	2.233	1.639	0.696
<b>Description:</b> This program will develop ammunition logistics systems that improve munitions survivability and logistics			
<b>FY 2021 Plans:</b> Continue to integrate passive time/temperature exposure sensor including exploring alternative technologies. Will continue to integrate the munitions health monitoring system with additional ammunition items including item specific form factors. Conduct verification testing of a type II prototype next generation temperature/humidity sensor. Conduct an assessment on the value of storing data in various formats from data rich to highly summarized to support a business case analysis of the transfer and long term storage of data in an overarching data system. Conduct environmental testing on phase 2 health monitoring suite (RRAPDS) prototypes. Conduct verification testing of alternative form factor munitions health monitoring system on multiple packaging types.			
<b>FY 2022 Plans:</b> Assess commercial off the shelf low cost active and passive environmental sensors for applicability of integration to ammunition packaging consolidation techniques to improve transportation efficiencies through last tactical mile. Conduct qualification testing of a type II prototype next generation temperature/humidity sensor. Conduct qualification testing of alternative form factor munitions health monitoring system on multiple packaging types.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EL9 / Ammunitions Logistics Prototyping

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Funding decrease due to maturity level of items ready for transition to PM.			
<b>Accomplishments/Planned Programs Subtotals</b>	2.233	1.639	0.696

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

N/A

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy is to work directly with the relevant PMs (Combat Ammunition Systems (CAS) & Self Propelled Howitzer (SPH)) to support the development of a resupply system/process to meet the needs of the Extended Range Canon Artillery (ERCA) system. The resultant capabilities will then be transitioned to the appropriate PM for further maturation and/or fielding.



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EL9 / Ammunitions Logistics Prototyping							
Product Development (\$ in Millions)				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
Contractor	C/FFP	Karagozian & Case : Glendale, CA	1.699	0.285	Mar 2020	0.367	Jan 2021	-		-		-	0.000	2.351	-
Contractor	C/FFP	Phase IV : Boulder, CO	0.460	-		-		-		-		-	0.000	0.460	-
Contractor	C/FFP	Cybernet : Ann Arbor, MI	-	-		-		0.500	Jan 2022	-		0.500	0.000	0.500	-
Contractor	C/FFP	AGM : Tuscon, AZ	-	0.856	May 2020	0.466	May 2021	-		-		-	0.000	1.322	-
Contractor	C/FFP	Stevens Institute of Technology : Hoboken, NJ	-	0.167	Sep 2020	0.150	Jul 2021	-		-		-	0.000	0.317	-
Contractor	C/FFP	Mide Tech Corp : Woburn, MA	-	0.203	Jul 2020	0.168	Jun 2021	-		-		-	0.000	0.371	-
<b>Subtotal</b>			2.159	1.511		1.151		0.500		-		0.500	0.000	5.321	N/A
Support (\$ in Millions)				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
Combat Capabilities Development Command, Armaments Center (CCDC, AC)	MIPR	Picatiny Arsenal : NJ	0.311	0.722	Dec 2019	0.488	Dec 2020	0.196	Oct 2021	-		0.196	0.000	1.717	-
<b>Subtotal</b>			0.311	0.722		0.488		0.196		-		0.196	0.000	1.717	N/A
<b>Project Cost Totals</b>			2.470	2.233		1.639		0.696		-		0.696	0.000	7.038	N/A
<b>Remarks</b>															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EL9 / Ammunitions Logistics Prototyping

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
System Development - Munitions Health Monitoring System (RR)	█				█																							
System Development - Low Cost Thermal Indicator	█				█																							
System Development - Plastic Cylindrical Container													█				█											
System Development - Plastic Rectangular Container													█				█											
System Development - Next Generation Temperature/Humidity Sensor																	█				█							
System Development - Tactical Munitions Monitoring													█				█											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EL9 / Ammunitions Logistics Prototyping

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Development - Munitions Health Monitoring System (RRAPDS)	2	2018	4	2021
System Development - Low Cost Thermal Indicator	1	2020	4	2020
System Development - Plastic Cylindrical Container	1	2023	4	2024
System Development - Plastic Rectangular Container	1	2023	4	2024
System Development - Next Generation Temperature/Humidity Sensor	3	2020	4	2021
System Development - Tactical Munitions Monitoring	1	2022	4	2024

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EP2 / Shoulder-Launched Munitions			
<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>
EP2: <i>Shoulder-Launched Munitions</i>	-	3.931	10.011	0.987	-	0.987	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The XM919 Individual Assault Munition (IAM) will be a lightweight Shoulder Launched Munition (SLM) capability for combat units at the individual Soldier level. As the next generation SLM, the solution will fit within the Soldier Lethality Modernization Priority, by reducing Soldier load, while providing tactical innovation capable of extending overmatch against near-peer adversaries in a joint, multi-domain, high-intensity conflict. The XM919 IAM will allow Soldiers to conduct Urban Operations and will allow Soldiers to defeat adversaries protected by field expedient structures and light armored vehicles while providing behind the wall lethality effects. This solution will be effective day or night with the ability to safely engage targets from within enclosures, increasing Soldier survivability. This solution will combine the capabilities of the existing Bunker Defeat Munition (BDM) and the AT4 Confined Space - Reduced Sensitivity (AT4CS-RS), which will reduce the logistics burden of having to maintain and train multiple systems. The Individual Assault Munition Capabilities Development Document (CDD) was approved on 11 March 2016. FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation in support of a Milestone C decision.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> XM919 Individual Assault Munition (IAM)	3.931	10.011	0.987
<p><b>Description:</b> The XM919 IAM program entered the Engineering and Manufacturing Development (EMD) Phase (MDD approved in 3QFY2020) and awarded multiple 10 US Code (U.S.C.) 2373 "Procurement for Experimentation Purposes" contracts to obtain Shoulder Launched Munition test hardware in support of Phase 1 (System Assessment Phase). The test hardware (tactical and training) will be used to evaluate the maturity of industry solutions to inform both user requirements and the Milestone C production decision. Data gained during the System Assessment phase will be used to develop MS C acquisition documentation and support the production decision. Following production decision and the award of a competitive multi-year production contract, the XM919 IAM program will conduct a User Excursion Soldier Touch Point prior to Type Classification and Full Materiel Release.</p> <p><b>FY 2021 Plans:</b> FY 2021 funding will support test hardware build, initiation of live test firing, development of acquisition documentation, and data compilation.</p> <p><b>FY 2022 Plans:</b> FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation in support of a Milestone C decision.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EP2 / <i>Shoulder-Launched Munitions</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2022 funding is needed to complete testing, Soldier touch point activities, development of test reports and documentation in support of a Milestone C decision.			
<b>Accomplishments/Planned Programs Subtotals</b>	3.931	10.011	0.987

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

N/A

**Remarks**

**D. Acquisition Strategy**

The XM919 Individual Assault Munition (IAM) acquisition strategy is a two phased approach that consists of an accelerated system assessment phase and a production phase. The system assessment phase will survey industry and assess available mature tactical and training hardware solutions through live test firings and soldier touch points to inform the XM919 IAM CDD update and a Milestone C production decision. Upon a successful production decision, the second phase will commence through a competitive multi year production contract award. The XM919 IAM will replace the AT4CS and BDM shoulder launched munition systems.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP2 / Shoulder-Launched Munitions
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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			
Individual Assault Munition (IAM) Hardware 1	C/FFP	SAAB : Stockholm, Sweden	-	0.593	Aug 2020	0.571	Jan 2021	-		-		-	0.000	1.164	-
Individual Assault Munition (IAM) Hardware 2	C/FFP	Dynamit Nobel Defense : Burbach, Germany	-	1.120	Aug 2020	0.816	Jan 2021	-		-		-	0.000	1.936	-
Individual Assault Munition (IAM) Trainer 1	C/FFP	TBD : TBD	-	-		0.300	Jun 2021	-		-		-	0.000	0.300	-
Individual Assault Munition (IAM) Trainer 2	C/FFP	TBD : TBD	-	-		0.300	Jun 2021	-		-		-	0.000	0.300	-
<b>Subtotal</b>			-	1.713		1.987		-		-		-	0.000	3.700	N/A

<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			
Tactical Engineering Support - Gov	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.890	Jun 2020	1.810	Feb 2021	0.531	Oct 2021	-		0.531	0.000	3.231	-
Trainer Engineering Support - Gov	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		1.193	Feb 2021	0.146	Oct 2021	-		0.146	0.000	1.339	-
Engineering Support - Contract	C/CPFF	Booz Allen Hamilton : McLean, VA	-	-		0.310	Dec 2020	0.310	Dec 2021	-		0.310	0.000	0.620	-
<b>Subtotal</b>			-	0.890		3.313		0.987		-		0.987	0.000	5.190	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			
Tactical Evaluation Test and Targets	MIPR	Various : Various	-	1.328	May 2021	3.200	Feb 2021	-		-		-	0.000	4.528	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP2 / Shoulder-Launched Munitions

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
Individual Assault Munition (IAM) Milestone B			1 MS-B																									
Engineering and Manufacturing Development Contract			EMD Contract																									
Live Test Firing											Live Test Firing																	
User Jury (Soldier Touch Point)															User Jury													
Environmental Testing																			Environmental Testing									
Milestone C																											2 MS-C	



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EP2 / <i>Shoulder-Launched Munitions</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Individual Assault Munition (IAM) Milestone B	3	2020	3	2020
Engineering and Manufacturing Development Contract	4	2020	3	2022
Live Test Firing	4	2021	2	2022
User Jury (Soldier Touch Point)	2	2022	3	2022
Environmental Testing	3	2022	3	2022
Milestone C	1	2023	1	2023

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber			
<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>
EP3: <i>Reduced Range Ammunition - Small Caliber</i>	-	6.000	13.816	14.000	-	14.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62 millimeter (mm) and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. Fiscal Year (FY) 2022 funding supports completing Engineering and Manufacturing Development (EMD) efforts, conducting Production Qualification Testing (PQT), and performing activities to prepare for ammunition production transition to the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) on the 7.62mm variant. FY 2022 also includes continuing the EMD effort, conducting safety release testing, conducting a Limited User Assessment (LUA) / User Evaluation, and performing PQT on the 50 caliber variant.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Engineering and Manufacturing Development 7.62mm</p> <p><b>Description:</b> EMD Activities for 7.62mm Reduced Range Ammunition.</p> <p><b>FY 2021 Plans:</b> Continue EMD efforts, conduct Pre-Production Qualification Testing (PPQT), conduct a Critical Design Review (CDR), and perform activities to prepare for transition to the LCAAP.</p> <p><b>FY 2022 Plans:</b> Complete EMD, conduct PQT, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for Low-Rate Initial Production (LRIP).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> EMD effort planned for completion in FY 2022.</p>	3.406	5.816	4.100
<p><b>Title:</b> Engineering and Manufacturing Development .50 Caliber</p> <p><b>Description:</b> EMD Activities for .50 Cal Reduced Range Ammunition.</p> <p><b>FY 2021 Plans:</b></p>	2.594	8.000	9.900

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue the EMD effort, conduct Pre-Production Qualification Testing (PPQT), conduct a Preliminary Design Review, and conduct a Critical Design Review (CDR) .			
<b><i>FY 2022 Plans:</i></b> Continue the EMD effort, conduct safety release testing, conduct a LUA, and perform PQT.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Planned increase due to PQT activities for 3 competing contractors.			
<b>Accomplishments/Planned Programs Subtotals</b>	6.000	13.816	14.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

After 7.62mm Milestone (MS) B in FY 2019, the Government awarded competitive Engineering and Manufacturing Development (EMD) contracts. Upon completing Production Qualification Testing (PQT), the government will then down-select to a single contractor to complete EMD. The .50 Caliber program follows a similar strategy. The Government awarded multiple competitive contracts for the .50 Caliber EMD.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber
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<b>Product Development (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Development Contract 7.62mm EMD # 1	Option/CPFF	General Dynamics : St. Petersburg, Florida	0.900	1.016	Feb 2020	1.000	Feb 2021	-		-		-	Continuing	Continuing	Continuing
Development Contract 7.62mm EMD # 2	Option/CPFF	Nammo Tally : Mesa, Arizona	0.750	0.663	Feb 2020	1.000	Feb 2021	-		-		-	Continuing	Continuing	Continuing
Development Contract 7.62mm EMD Down-Select	Option/CPFF	To Be Determined : To Be Determined	-	-		-		1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
Development Contract 7.62mm Transition to Lake City Army Ammunition Plant (LCAAP)	Option/CPFF	OLIN Winchester Corporation : Independence, Missouri	-	0.509	Sep 2020	-		0.500	Jan 2022	-		0.500	0.000	1.009	-
Development Contract 7.62mm Tracer Manufacturing	Option/CPFF	OLIN Winchester Corporation : Independence, Missouri	-	-		0.500	Jun 2021	0.500	Jan 2022	-		0.500	0.000	1.000	-
Development Contract .50 Cal Contractor 1	Option/CPFF	St. Petersburg, Florida : St. Petersburg, Florida	-	0.352	Feb 2020	2.475	Mar 2021	3.000	Jan 2022	-		3.000	Continuing	Continuing	Continuing
Development Contract .50 Cal Contractor 2	Option/CPFF	Nammo Tally : Mesa, Arizona	-	0.463	Feb 2020	2.475	Mar 2021	3.000	Jan 2022	-		3.000	Continuing	Continuing	Continuing
Prototype Development	Option/CPAF	Booz Allen Hamilton : Dover, NJ	0.309	0.081	Feb 2020	-		-		-		-	0.000	0.390	-
<b>Subtotal</b>			1.959	3.084		7.450		8.000		-		8.000	Continuing	Continuing	N/A

<b>Support (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Combat Capabilities Development Command, Armaments Center (CCDC AC) 7.62mm	MIPR	Picatinny Arsenal : New Jersey	1.759	0.938	Oct 2019	1.616	Oct 2020	0.900	Oct 2021	-		0.900	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EP3 / Reduced Range Ammunition - Small Caliber							
Support (\$ in Millions)				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
Combat Capabilities Development Command, Armaments Center (CCDC AC) .50 Cal	MIPR	Picatinny Arsenal : New Jersey	-	1.050	Oct 2019	1.000	Oct 2020	1.400	Oct 2021	-		1.400	Continuing	Continuing	Continuing
US Army Research Lab (ARL) 7.62mm	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	0.270	Oct 2019	-		0.600	Oct 2021	-		0.600	Continuing	Continuing	Continuing
US Army Research Lab (ARL) .50 Cal	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.800	Oct 2021	-		0.800	Continuing	Continuing	Continuing
<b>Subtotal</b>			1.759	2.258		2.616		3.700		-		3.700	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
Design Verification Test (DVT 7.62mm)	MIPR	U.S. Army Test Center : Yuma, Arizona	0.482	-		-		-		-		-	0.000	0.482	-
Engineering Tests 7.62mm	MIPR	U.S. Army Test Center : Aberdeen, Maryland	-	-		0.200	Oct 2020	-		-		-	0.000	0.200	-
Pre-Production Qualification Testing (PPQT 7.62mm)	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		1.500	Dec 2020	-		-		-	Continuing	Continuing	Continuing
Production Qualification Testing (PQT 7.62mm)	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		-		0.600	Nov 2021	-		0.600	Continuing	Continuing	Continuing
Pre-Production Qualification Testing (PPQT) .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		1.400	Nov 2020	-		-		-	0.000	1.400	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber

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				
7.62mm Engineering and Manufacturing Development (EMD)	7.62mm EMD																															
7.62mm Preliminary Design Review (PDR)	3 7.62mm PDR																															
7.62mm Pre-Production Qualification Test (PPQT)	7.62mm PPQT																															
7.62mm Developmental Test and Evaluation (DT&E)	7.62mm DT&E																															
7.62mm Soldier Touch Point (STP)	7.62mm STP																															
7.62mm Critical Design Review (CDR)	5 7.62mm CDR																															
7.62mm Production Qualification Test (PQT)	7.62mm PQT																															
7.62mm Milestone C (MS C)	7 7.62mm MS C																															
.50 Caliber Multiple Concept Design Evaluations	.50 Caliber Multiple Concept Design Evaluations																															
.50 Caliber Milestone B (MS B)	1 .50 Cal MS B																															
.50 Caliber Transitions from BA04 EL7 to BA05 EP3	2 .50 Cal BA04 to BA05 Transition																															
.50 Caliber Engineering and Manufacturing Development (EMD)	.50 Cal EMD																															
.50 Caliber Preliminary Design Review (PDR)	4 .50 Cal PDR																															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber

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
.50 Caliber Pre-Production Qualification Test (PPQT)					[Redacted] .50 Cal PPQT																							
.50 Caliber Critical Design Review (CDR)									▲ 6 .50 Cal CDR																			
.50 Caliber Safety Release Testing									[Redacted] .50 Cal Safety Release Testing																			
.50 Caliber Production Qualification Test (PQT)													[Redacted] .50 Cal PQT															
.50 Caliber Limited User Evaluation (LUA)													[Redacted] .50 Cal LUA															
.50 Caliber Milestone C (MS C)																	▲ 8 .50 Cal MS C											



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EP3 / <i>Reduced Range Ammunition - Small Caliber</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
7.62mm Multiple Concept Design Evaluations	1	2017	4	2018
7.62mm Materiel Development Decision (MDD)	4	2017	4	2017
7.62mm Design Verification Test (DVT)	2	2018	3	2018
7.62mm Milestone B (MS B)	1	2019	1	2019
7.62mm Transitions from BA04 EL7 to BA05 EP3	1	2019	1	2019
7.62mm Engineering and Manufacturing Development (EMD)	1	2019	4	2022
7.62mm Preliminary Design Review (PDR)	2	2020	2	2020
7.62mm Pre-Production Qualification Test (PPQT)	1	2021	3	2021
7.62mm Developmental Test and Evaluation (DT&E)	1	2021	3	2021
7.62mm Soldier Touch Point (STP)	3	2021	3	2021
7.62mm Critical Design Review (CDR)	4	2021	4	2021
7.62mm Production Qualification Test (PQT)	2	2022	4	2022
7.62mm Milestone C (MS C)	4	2022	4	2022
.50 Caliber Project Starts on BA04 EL7	1	2018	1	2018
.50 Caliber Multiple Concept Design Evaluations	1	2018	1	2020
.50 Caliber Materiel Development Decision (MDD)	2	2018	2	2018
.50 Caliber Design Verification Test (DVT)	2	2019	3	2019
.50 Caliber Milestone B (MS B)	1	2020	1	2020
.50 Caliber Transitions from BA04 EL7 to BA05 EP3	1	2020	1	2020
.50 Caliber Engineering and Manufacturing Development (EMD)	1	2020	2	2023
.50 Caliber Preliminary Design Review (PDR)	2	2021	2	2021
.50 Caliber Pre-Production Qualification Test (PPQT)	1	2021	3	2021

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP3 / Reduced Range Ammunition - Small Caliber
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Events	Start		End	
	Quarter	Year	Quarter	Year
.50 Caliber Critical Design Review (CDR)	4	2021	4	2021
.50 Caliber Safety Release Testing	4	2021	1	2022
.50 Caliber Production Qualification Test (PQT)	2	2022	4	2022
.50 Caliber Limited User Evaluation (LUA)	3	2022	3	2022
.50 Caliber Milestone C (MS C)	2	2023	2	2023

**Note**

Next Generation Squad Weapon (NGSW)

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo			
<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>
EP4: One-Way Luminescence for Small Caliber Ammo	-	8.195	13.467	6.896	-	6.896	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62 millimeter (mm) and 5.56mm Families of Ammunition Capabilities Development Documents (CDD) and .50 Caliber Munitions CDD. Current small caliber ammunition tracer rounds are a pyrotechnic tracer mix which allows enemy forces to see the trace round and track its trajectory back to the shooter. The OWL projects objective is to develop and field a full tracer round, replace the current pyrotechnic cartridges with trace cartridges that are only visible to the shooter and soldiers in close proximity, increasing soldier survivability, and increasing lethality by incorporating Enhanced Performance Round (EPR) technology into the new tracer ammunition. 7.62mm and 5.56mm are the immediate focus; later followed by .50 Caliber cartridges and Next Generation Squad Weapons (NGSW) ammunition. Fiscal Year (FY) 2022 funding will support continuing Engineering and Manufacturing Development (EMD), performing Production Qualification Testing (PQT), conducting Live Fire Test and Evaluation (LFT&E), conducting a Critical Design review (CDR), conducting a Limited User Evaluation (LUE), and performing preparation activities for manufacturing at the Lake City Army Ammunition Plant (LCAAP) in preparation for Low-Rate Initial Production (LRIP) for the 7.62mm variant. FY 2022 funding will also support EMD efforts, a Preliminary Design Review (PDR), Pre-Production Qualification Testing (PPQT), and a Soldier Touch Point STP / User Evaluation for the 5.56mm variant. FY 2022 also supports assessing OWL technologies for the potential to adapt the technology into other small caliber ammunition variants.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> EMD 7.62mm	8.100	7.100	2.000
<b>Description:</b> EMD efforts for the 7.62mm variant.			
<b>FY 2021 Plans:</b> Continuing EMD efforts, perform Safety Release Tests, perform preparation activities to conduct a CDR, and down-select to a single contractor to complete EMD.			
<b>FY 2022 Plans:</b> Complete EMD efforts, perform PQT, conduct LFT&E, conduct a CDR, conduct a LUE, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for LRIP.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> EMD effort to be completed in FY 2022. Effort transitions to production.			
<b>Title:</b> EMD 5.56mm	-	6.217	4.781

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> EMD efforts for the 5.56mm variants.</p> <p><b>FY 2021 Plans:</b> Start EMD efforts, perform Design Verification Tests (DVT), and begin preparation for the PDR.</p> <p><b>FY 2022 Plans:</b> Continue EMD efforts, conduct a PDR, conduct PPQT, and conduct a STP / User Evaluation.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Planned EMD activities in FY 2022.</p>			
<p><b>Title:</b> Prototype and Concept Evaluation for Other Small Caliber Ammunition</p> <p><b>Description:</b> Supports concept development/evaluation of applying OWL tracer solutions to other small caliber ammunition; including .50 Caliber ammunition.</p> <p><b>FY 2021 Plans:</b> Assess OWL technologies for potential to adapt the technology into the into other small caliber ammunition variants.</p> <p><b>FY 2022 Plans:</b> Will continue to assess OWL technologies for potential to adapt the technology into other small caliber ammunition variants.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> To cover planned activities in FY 2022.</p>	0.095	0.150	0.115
<b>Accomplishments/Planned Programs Subtotals</b>	8.195	13.467	6.896

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<b>Line Item</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 Total Cost</b>
• EB8: OWL for Small Caliber Ammunition	1.918	-	-	-	-	-	-	-	-	-

**Remarks**  
 OWL is a new tracer technology that will be applied to multiple calibers. The initial focus was on 7.62mm ammunition in FY 2015 followed by 5.56mm in FY 2018; and later followed by the .50 Caliber and NGSW ammunition. As the technology matured the effort transitioned from BA4 PE 0603639A Tank and Medium Caliber Ammunition Project EB8 One Way Luminescence (OWL) to BA5 PE 0604802A One-Way Luminescence for Small Caliber Ammo Project EP4 One Way Luminescence

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
(OWL) for Small Caliber Ammunition in FY 2019 for 7.62mm, and FY 2021 for 5.56mm. The OWL cartridge will be compatible with all Army Small Caliber weapon systems, but optimized for Machine Guns and will provide improved survivability and lethality / target effects over the current tracer munition.											

**D. Acquisition Strategy**

The OWL concept will be developed through Government and Industry prototyping efforts. Technology Readiness Assessments (TRAs) were conducted in FY 2017 and FY 2018 to evaluate the industry and Government concepts in order to proceed with the 7.62mm EMD. The 5.56mm, NGSW, and .50 Caliber cartridges will follow the 7.62mm schedule with EMD starting in FY 2021 for the 5.56mm variant after conducting a TRA and achieving Technology Readiness Level 6 (TRL6) in FY 2020. The new tracer cartridges will replace legacy tracers in each of the various small caliber configurations.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EP4 / One-Way Luminescence for Small Caliber Ammo							
Product Development (\$ in Millions)				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
Program Manager Maneuver Ammunition Systems (PM MAS)	Various	Picatinny Arsenal : New Jersey	0.014	0.001	Oct 2019	0.006	May 2021	-		-		-	0.000	0.021	-
EMD Contractor # 1 (7.62mm)	Option/CPFF	General Dynamics : Florham Park, NJ	1.000	2.908	Jan 2020	0.736	Mar 2021	-		-		-	0.000	4.644	-
EMD Contractor # 2 (7.62mm)	Option/CPFF	Nammo Tally : Mesa, AZ	1.082	2.400	Jan 2020	0.736	Nov 2020	-		-		-	0.000	4.218	-
Down-Selected EMD Contractor (7.62mm)	Option/CPFF	To be determined : To be determined	-	-		0.500	Jun 2021	0.500	Oct 2021	-		0.500	Continuing	Continuing	Continuing
OWL Manufacturing Tooling Development (7.62mm)	Option/CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	1.244	-		-		0.100	Oct 2021	-		0.100	Continuing	Continuing	Continuing
OWL Prototype Development (7.62mm)	Option/CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	-	0.951	Mar 2020	1.372	Nov 2020	-		-		-	Continuing	Continuing	Continuing
Lake City Army Ammunition Plant Tech Integration (7.62mm)	Option/FFP	OLIN Winchester Corporation : Independence, MO	-	-		0.550	May 2021	0.600	Oct 2021	-		0.600	Continuing	Continuing	Continuing
Lake City Army Ammunition Plant Tech Integration (5.56mm)	Option/FFP	OLIN Winchester Corporation : Independence, MO	-	-		-		1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
OWL Manufacturing Tooling Development (5.56mm)	Option/CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	-	-		1.745	Nov 2020	0.250	Oct 2021	-		0.250	Continuing	Continuing	Continuing
EMD Contract (5.56mm)	Option/CPFF	OLIN Winchester Corporation : Independence, MO	-	-		2.200	May 2021	2.000	Oct 2021	-		2.000	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.340	6.260		7.845		4.450		-		4.450	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo
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<b>Support (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
CCDC Armaments Center (CCDC-AC) 7.62mm	MIPR	Picatinny Arsenal : New Jersey	1.739	0.645	Oct 2019	2.350	Nov 2020	0.700	Oct 2021	-		0.700	Continuing	Continuing	Continuing
Product Development Support (7.62mm)	Option/FFP	Leidos Inc. : Reston, VA	0.068	-		-		-		-		-	0.000	0.068	-
CCDC Armaments Center (CCDC-AC) 5.56mm	MIPR	Picatinny Arsenal : New Jersey	-	-		1.822	Nov 2020	0.900	Oct 2021	-		0.900	Continuing	Continuing	Continuing
OWL Solutions/Evaluation	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	0.095	Oct 2019	0.150	Feb 2021	0.115	Oct 2021	-		0.115	Continuing	Continuing	Continuing
<b>Subtotal</b>			1.807	0.740		4.322		1.715		-		1.715	Continuing	Continuing	N/A

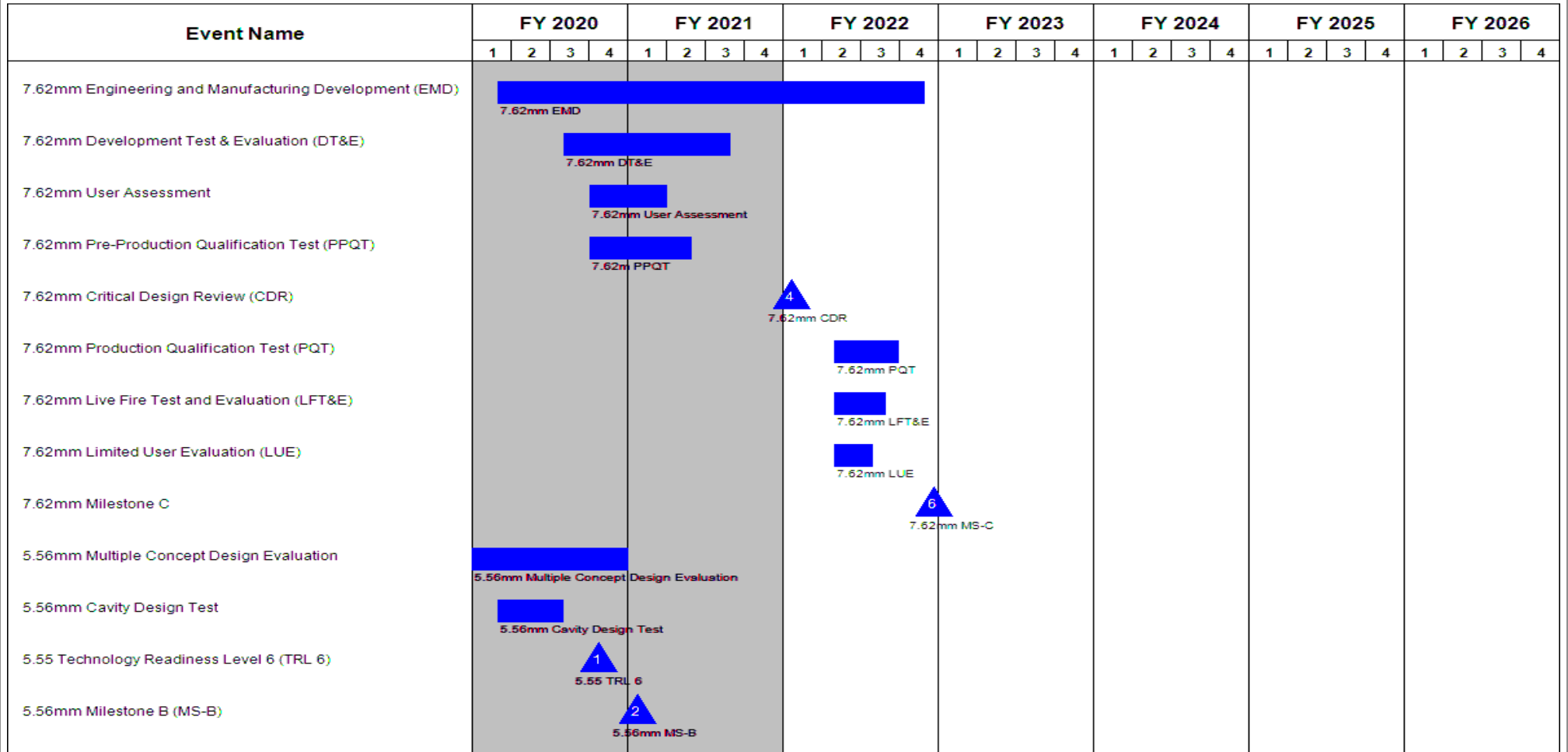
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
U.S. Army Aberdeen Test Center (ATC) 7.62mm	MIPR	Aberdeen Proving Ground : Maryland	0.060	0.425	Oct 2019	0.500	May 2021	-		-		-	Continuing	Continuing	Continuing
Independent Testing (7.62mm)	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, MO	0.035	0.050	Oct 2019	-		0.100	Feb 2022	-		0.100	0.000	0.185	-
User Evaluation (7.62mm)	MIPR	US Army Maneuver Battle Labs : Fort Benning, GA	-	0.180	Oct 2019	0.050	Apr 2021	-		-		-	0.000	0.230	-
Radar Testing (7.62mm)	MIPR	US Army Research Lab : Aberdeen, MD	0.563	0.540	Oct 2019	0.300	May 2021	-		-		-	Continuing	Continuing	Continuing
Data Analysis and Testing (7.62mm)	MIPR	US Army COE-ERDC : Vicksburg, VA	0.050	-		-		-		-		-	0.000	0.050	-
Safety Release Testing (5.56mm)	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		0.200	May 2021	-		-		-	0.000	0.200	-





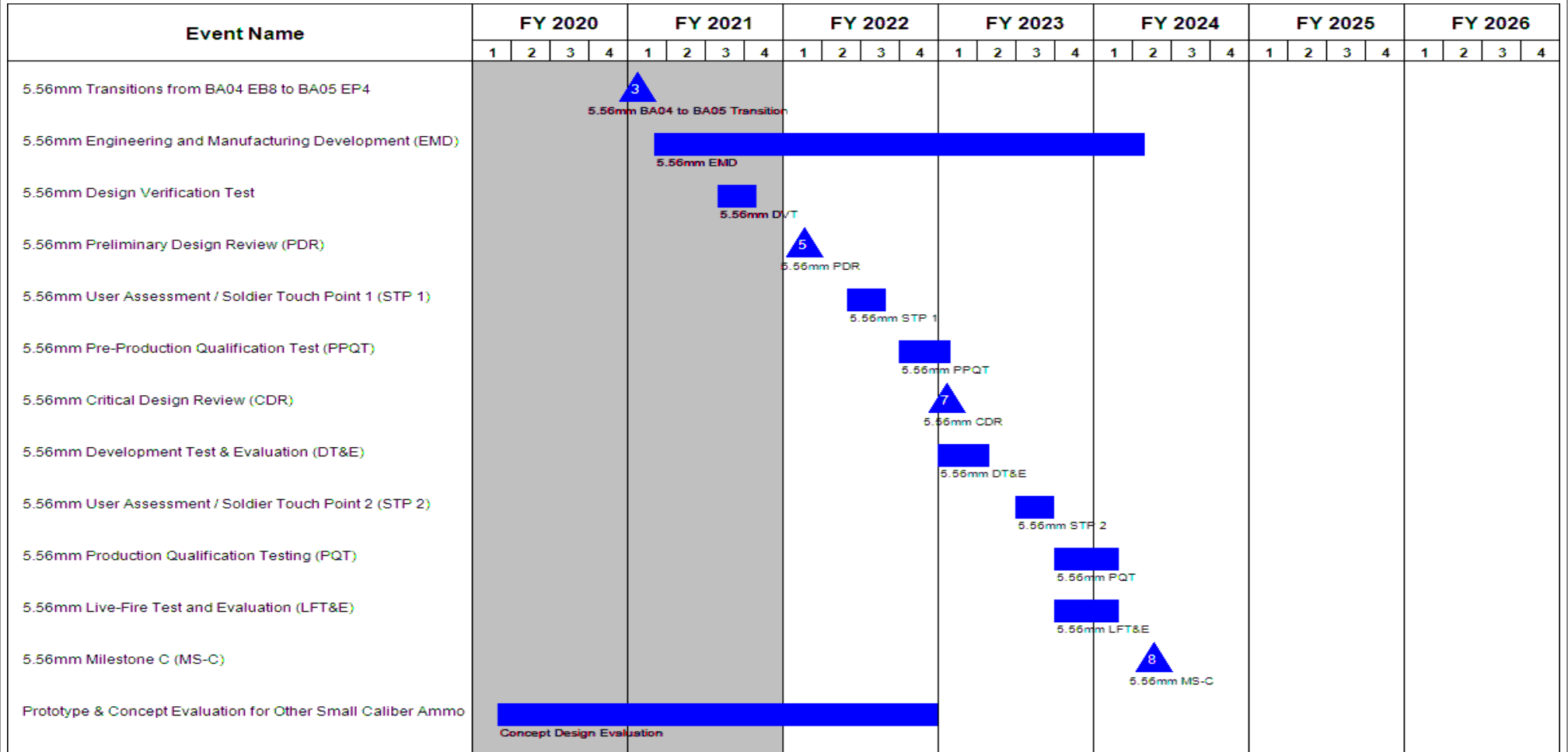
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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
7.62mm Materiel Development Decision (MDD)	4	2016	4	2016
7.62mm Multiple Concept Design Evaluation	1	2015	1	2019
7.62mm Milestone B (MS-B)	1	2019	1	2019
7.62mm Transitions from BA04 EB8 to BA05 EP4	1	2019	1	2019
7.62mm Engineering and Manufacturing Development (EMD)	1	2019	4	2022
7.62mm Design Verification Test	2	2019	3	2019
7.62mm Preliminary Design Review (PDR)	3	2019	3	2019
7.62mm Development Test & Evaluation (DT&E)	3	2020	3	2021
7.62mm User Assessment	4	2020	1	2021
7.62mm Pre-Production Qualification Test (PPQT)	4	2020	2	2021
7.62mm Critical Design Review (CDR)	1	2022	1	2022
7.62mm Production Qualification Test (PQT)	2	2022	3	2022
7.62mm Live Fire Test and Evaluation (LFT&E)	2	2022	3	2022
7.62mm Limited User Evaluation (LUE)	2	2022	3	2022
7.62mm Milestone C	4	2022	4	2022
5.56mm Materiel Development Decision (MDD)	3	2018	3	2018
5.56mm Project Starts on BA04 EB8	3	2018	3	2018
5.56mm Multiple Concept Design Evaluation	4	2018	4	2020
5.56mm Cavity Design Test	1	2020	3	2020
5.55 Technology Readiness Level 6 (TRL 6)	4	2020	4	2020
5.56mm Milestone B (MS-B)	1	2021	1	2021
5.56mm Transitions from BA04 EB8 to BA05 EP4	1	2021	1	2021

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP4 / One-Way Luminescence for Small Caliber Ammo
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Events	Start		End	
	Quarter	Year	Quarter	Year
5.56mm Engineering and Manufacturing Development (EMD)	1	2021	2	2024
5.56mm Design Verification Test	3	2021	4	2021
5.56mm Preliminary Design Review (PDR)	1	2022	1	2022
5.56mm User Assessment / Soldier Touch Point 1 (STP 1)	2	2022	3	2022
5.56mm Pre-Production Qualification Test (PPQT)	4	2022	1	2023
5.56mm Critical Design Review (CDR)	1	2023	1	2023
5.56mm Development Test & Evaluation (DT&E)	1	2023	2	2023
5.56mm User Assessment / Soldier Touch Point 2 (STP 2)	3	2023	3	2023
5.56mm Production Qualification Testing (PQT)	4	2023	1	2024
5.56mm Live-Fire Test and Evaluation (LFT&E)	4	2023	1	2024
5.56mm Milestone C (MS-C)	2	2024	2	2024
Prototype & Concept Evaluation for Other Small Caliber Ammo	1	2020	4	2022

**Note**

As the technology matures, the One Way Luminescence (OWL) projects transitions from BA4 PE 0603639A Tank and Medium Caliber Ammunition Project EB8 One Way Luminescence (OWL) to BA5 PE 0604802A One-Way Luminescence for Small Caliber Ammo Project EP4 One Way Luminescence (OWL) for Small Caliber Ammunition

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expendable Countermeasures			
<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>
EP7: Aviation Airborne Expendable Countermeasures	-	4.717	4.313	7.526	-	7.526	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Project EB9 / Aviation Airborne Expendable Countermeasures within PE 0603639A / Tank and Medium Caliber Ammunitions transitions to Engineering and Manufacturing Development (EMD) under Project EP7 / Aviation Airborne Expendable Countermeasures within PE 0604802A / Weapons and Munitions - Eng Dev.

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

Aviation Airborne Expendable Countermeasures (AAECM) will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on expendable countermeasure flares and decoys to include the XM215 Infrared (IR) countermeasure Flare and XM20 Radio Frequency (RF) expendables. These expendable countermeasures systems are an essential part of survivability equipment for Army aircraft. Army Research Development Technology & Evaluation (RDT&E) efforts are coordinated with Program Executive Office (PEO) Aviation to address the AAECM capability, a critical enabler for enduring aircraft and the Future Vertical Lift (FVL) - Aircraft Survivability Equipment (ASE) Cross Functional Team (CFT) within Army's Top modernization priorities.

These advanced decoys will address deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and proliferated current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, environmental considerations, safety enhancements, manufacturing enhancements, qualification of other service and foreign munitions that could meet current requirements, product improvements, insertion of new technologies to increase performance, and enhancement of current flare solutions for new and existing aircraft. Systems include impulse cartridges and aircraft expendables (to include RF expendables). FY 2022 will support the final prototype build, development testing, and operational testing of the XM215 design as well as operational test and evaluation for the XM20 design.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Improvements to Countermeasure Flares	4.717	4.313	7.526
<b>Description:</b> This program will develop XM215 Infrared and XM20 Radio Frequency expendable countermeasure flare/decoy to defeat specific threats of interest and qualify them for Army use. This program will also develop countermeasure patterns/cocktails solutions to integrate these new expendables into Army's rotary wing and fixed wing aircraft.			
<b>FY 2021 Plans:</b> FY 2021 activities include refining XM215 design, conduct design verification testing and flight testing.			
<b>FY 2022 Plans:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expendable Countermeasures

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2022 will continue development of the XM215 countermeasure and conduct developmental testing and operational testing of the final flare design. Development and flight testing for the XM20 countermeasure will continue as well.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Continued development of the XM215 countermeasure, build final flare design prototypes to support and conduct developmental testing and operational testing.			
<b>Accomplishments/Planned Programs Subtotals</b>	4.717	4.313	7.526

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• EB9: Aviation Airborne Expendable Countermeasures	3.055	4.332	5.529	-	5.529	-	-	-	-	-	-

**Remarks**  
Project EB9 Aviation Airborne Expendable Countermeasures within PE 0604802A / Weapons and Munitions - Eng Dev supports the XM20 Radio Frequency (RF) AAECM capability development.

**D. Acquisition Strategy**  
During the Materiel Solution Analysis (MSA), Milestone A phase, prototypes developed by the US Government (USG) and contractors were tested and evaluated against initial CDD requirements. The contractor developed XM20 design and the USG developed XM215 design were selected to enter into Engineering and Manufacturing Development (EMD), Milestone B phase, to finalize the design based on lessons learned from the MSA flight test and CDD requirements. The USG starts the transition to industry via Other Transaction Authority (OTA) contract mechanism in FY 2021. Industry prototypes will undergo Developmental and Operational Testing and final XM215 and XM20 configurations to support Milestone C in FY 2022.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expendable Countermeasures
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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			
XM215 Development Government	MIPR	CCDC Armaments Center : Picatinny Arsenal, NJ	-	1.426	Feb 2020	0.480	Feb 2021	0.658	Oct 2021	-		0.658	0.000	2.564	-
XM215 Development Contractor 1	C/CPFF	TBD : TBD	-	-		1.455	May 2021	0.806	Dec 2021	-		0.806	0.000	2.261	-
XM215 Development Contractor 2	C/CPFF	TBD : TBD	-	-		0.367	May 2021	0.594	Dec 2021	-		0.594	0.000	0.961	-
<b>Subtotal</b>			-	1.426		2.302		2.058		-		2.058	0.000	5.786	N/A

<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			
XM215 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	1.280	Dec 2019	1.335	Jan 2021	1.568	Oct 2021	-		1.568	0.000	4.183	-
XM20 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.913	Oct 2021	-		0.913	0.000	0.913	-
XM215 Prototyping Support	MIPR	Naval Surface Warfare Center : Crane, IN	-	0.500	Dec 2020	-		-		-		-	0.000	0.500	-
<b>Subtotal</b>			-	1.780		1.335		2.481		-		2.481	0.000	5.596	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			
XM215 Development and Operational Testing	MIPR	Various : Various	-	-		-		1.787	Mar 2022	-		1.787	0.000	1.787	-
XM215 Modeling and Simulation	MIPR	Naval Air Warfare : China Lake, CA	-	0.350	Jun 2020	0.180	Mar 2021	0.350	Nov 2021	-		0.350	0.000	0.880	-







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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expendable Countermeasures	

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
XM20 Modeling and Simulation			■																									
			XM20 M&S																									
XM20 Data Analysis																												
XM20 Milestone B																												
XM20 Development Contract																												
XM20 Qualification Build																												
XM20 Critical Design Review																												
XM20 Production Qualification Testing																												
XM20 Milestone C																												
XM20 Operational Test and Evaluation																												

**Note**  
 Project EB9 / Aviation Airborne Expendable Countermeasures within PE 0603639A / Tank and Medium Caliber Ammunitions transitions to Engineering and Manufacturing Development (EMD) under Project EP7 / Aviation Airborne Expendable Countermeasures within PE 0604802A / Weapons and Munitions - Eng Dev.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EP7 / <i>Aviation Airborne Expendable Countermeasures</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
XM215 Infrared Development	1	2019	4	2025
XM215 Milestone A	1	2019	1	2019
XM215 Prototyping	1	2019	2	2020
XM215 Down Select	3	2019	3	2019
XM215 Testing Efforts (Stability/Heat/Cold)	3	2019	2	2020
XM215 Flight Testing	1	2020	2	2020
XM215 Milestone B	2	2020	2	2020
XM215 Engineering and Manufacturing Development	2	2020	4	2022
XM215 Design Verification Test	2	2021	3	2021
XM215 Flight Test	4	2021	2	2022
XM215 Developmental and Operational Testing	3	2022	4	2022
XM215 Milestone C	4	2022	4	2022
XM20 Radio Frequency Development	1	2019	4	2025
XM20 Milestone A	1	2019	1	2019
XM20 Prototype Development	1	2019	4	2019
XM20 Demonstrations	2	2019	3	2019
XM20 Technology Maturation and Risk Reduction	1	2020	2	2021
XM20 Flight Testing	2	2020	2	2020
XM20 Modeling and Simulation	3	2020	4	2020
XM20 Data Analysis	1	2021	2	2021
XM20 Milestone B	2	2021	2	2021
XM20 Development Contract	2	2021	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EP7 / Aviation Airborne Expendable Countermeasures
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Events	Start		End	
	Quarter	Year	Quarter	Year
XM20 Qualification Build	2	2021	3	2021
XM20 Critical Design Review	3	2021	3	2021
XM20 Production Qualification Testing	4	2021	2	2022
XM20 Milestone C	3	2022	3	2022
XM20 Operational Test and Evaluation	4	2022	4	2022

**Note**

Project EB9 Aviation Airborne Expendable Countermeasures within Program Element (PE) 0603639A Tank and Medium Caliber Ammunitions transitions to EMD under Project EP7 Aviation Airborne Expendable Countermeasures within PE 0604802A Weapons and Munitions - Eng Dev.

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EU4 / 40mm HV Improved High Explosive Dual Purpose			
<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>
EU4: 40mm HV Improved High Explosive Dual Purpose	-	12.517	8.046	2.111	-	2.111	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

40 millimeter (mm) High Velocity (HV) High Explosive Dual Purpose - Airburst (HEDP-AB) is a new capability identified in the 40mm High Velocity Improved High Explosive Dual Purpose Cartridge Capability Development Document (CDD) and will provide the Mk19 Mod 3 Grenade Machine Gun (GMG) an airburst capable cartridge with the ability of achieving required lethal effects against enemy targets in the open and in defilade while maintaining the capability to defeat unarmored and lightly armored vehicles. Fiscal Year (FY) 2022 funding supports the completion of Developmental Test & Evaluation (DT&E), completion of a Limited User Evaluation (LUE), Milestone-C preparation activities and preparation activities for the Low Rate Initial Production 1 (LRIP 1) contract award.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Engineering and Manufacturing Development (EMD)	12.517	8.046	2.111
<b>Description:</b> Award EMD contracts to support Design Engineering Testing (DET) and Developmental Test & Evaluation (DT&E) of the 40mm dual purpose airburst capability.			
<b>FY 2021 Plans:</b> FY 2021 funding will support continuing EMD activities including Developmental Test & Evaluation (DT&E), Soldier Touch Point (STP), Family of Weapon Sights ? Crew Served (FWS-CS)and Common Remotely Operated Weapon Station (CROWS) Integration.			
<b>FY 2022 Plans:</b> FY 2022 funding supports the completion of Developmental Test & Evaluation (DT&E), completion of a Limited User Evaluation (LUE), Milestone-C preparation activities and preparation activities for the Low Rate Initial Production 1 (LRIP 1) contract award.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to planned reduction in EMD requirements in FY 2022. The program is expected to achieve MS-C in FY 2022.			
<b>Accomplishments/Planned Programs Subtotals</b>	12.517	8.046	2.111

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU4 / 40mm HV Improved High Explosive Dual Purpose

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	Total Cost
			Base	OCO	Total					Complete	
• E70505: CTG, 40MM, HV HEDP-AB, XM1176	-	-	13.844	-	13.844	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The 40mm HV HEDP-AB cartridge will be developed through a competitive EMD program. Milestone B approval was followed by a competitive award for the EMD phase which included DET 1 and DET 2 and an option for DT&E. One contractor was awarded to develop an airburst capable fuze to be retrofitted onto the currently fielded, High Explosive Dual Purpose cartridges and develop a Programming Unit. Test results will support the documentation for Milestone C. After Milestone C is achieved, a contract will be awarded for Low Rate Initial Production (LRIP) followed by two options.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU4 I 40mm HV Improved High Explosive Dual Purpose
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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			
Project Manager Maneuver Ammunition Systems (PM MAS)	MIPR	Picatinny Arsenal : NJ	0.542	-		-		-		-		-	0.000	0.542	-
Engineering and Manufacturing Development (EMD) Contract DET 1 & 2	C/CPFF	Rheinmatell, Day & Zimmermann Munitions : Rosslyn, Va.	4.858	4.972	Oct 2019	5.735	Dec 2020	-		-		-	Continuing	Continuing	Continuing
Engineering and Manufacturing Development (EMD) Contract DT&E	C/CPFF	Rheinmatell, Day & Zimmermann Munitions : Rosslyn, Va.	-	4.430	Oct 2019	-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			5.400	9.402		5.735		-		-		-	Continuing	Continuing	N/A

<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			
Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	3.610	1.780	Oct 2019	1.245	Oct 2020	1.861	Oct 2021	-		1.861	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.610	1.780		1.245		1.861		-		1.861	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			
Design Engineering Test (DET) 1	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	0.322	0.466	Oct 2019	-		-		-		-	0.000	0.788	-





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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU4 / 40mm HV Improved High Explosive Dual Purpose

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
Engineering and Manufacturing Development (EMD)	[Blue bar spanning FY 2020 Q1 to FY 2022 Q4]																											
Design Engineering Test (DET) 1	[Blue square in FY 2020 Q2]																											
Test Readiness Review for Design Engineering Test 2	[Blue triangle '1' in FY 2020 Q2]																											
Design Engineering Test (DET) 2	[Blue square in FY 2020 Q3]																											
Developmental Test & Evaluation (DT&E) Contract Award	[Blue triangle '2' in FY 2020 Q3]																											
Critical Design Review (CDR)	[Blue triangle '3' in FY 2020 Q4]																											
Developmental Test & Evaluation (DT&E) Build	[Blue square in FY 2021 Q1]																											
Developmental Test & Evaluation (DT&E)	[Blue bar in FY 2022 Q1]																											
Limited User Evaluation (LUE)	[Blue square in FY 2022 Q2]																											
Milestone C	[Blue triangle '4' in FY 2023 Q1]																											
Low Rate Initial Production (LRIP) Contract Award	[Blue triangle '5' in FY 2023 Q1]																											
Low Rate Initial Production (LRIP)	[Blue bar in FY 2023 Q2]																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EU4 / <i>40mm HV Improved High Explosive Dual Purpose</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone B Support Documents	2	2017	4	2018
Milestone B	4	2018	4	2018
Engineering and Manufacturing Development (EMD)	4	2018	4	2022
Test Readiness Review for Design Engineering Test 1	4	2019	4	2019
Design Engineering Test (DET) 1	1	2020	2	2020
Test Readiness Review for Design Engineering Test 2	2	2020	2	2020
Design Engineering Test (DET) 2	3	2020	4	2020
Developmental Test & Evaluation (DT&E) Contract Award	4	2020	4	2020
Critical Design Review (CDR)	1	2021	1	2021
Developmental Test & Evaluation (DT&E) Build	2	2021	3	2021
Developmental Test & Evaluation (DT&E)	1	2022	3	2022
Limited User Evaluation (LUE)	2	2022	2	2022
Milestone C	4	2022	4	2022
Low Rate Initial Production (LRIP) Contract Award	4	2022	4	2022
Low Rate Initial Production (LRIP)	1	2023	1	2024

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC)
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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
EU5: .50 Caliber All-Purpose Tactical cartridge (APTC)	-	-	3.931	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

Elimination: Project EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC) has no funding request for Fiscal Year (FY) 2022.

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

The APTC project is a critical technology development in response to the .50 caliber Munitions Capabilities Development Documents (CDD). The overall objective of All-Purpose Tactical Cartridge is to deliver Ball and Tracer ammunition that replaces and improves current legacy .50 caliber ammunition. The All-Purpose Tactical Cartridge will be compatible with all Army .50 caliber weapons but specifically optimized to work in the M2 Machine Guns. There is no Fiscal Year (FY) 2022 request.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> .50 Cal All-Purpose Tactical Cartridge EMD	-	3.931	-
<b>Description:</b> Engineering and Manufacturing Development (EMD) Activities for the development of the .50 Caliber All-Purpose Tactical Cartridge APTC.			
<b>FY 2021 Plans:</b> Will achieve Milestone B (MS-B), award two competing EMD contracts to two contractors, conduct Design Verification Test (DVT) on the competing concepts, and perform Pre-Production Qualification Testing (PPQT) on the competing concepts. And, make EMD continuation decision.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Planned program activities.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	3.931	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

Evaluate competing concepts/prototypes from contractors and Government. In FY 2021, the Government intends to make a decision on continuation of the Engineering and Manufacturing Development (EMD).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EU5 I .50 Caliber All-Purpose Tactical cartridge (APTC)							
Product Development (\$ in Millions)				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
Development Contract # 1	Option/CPFF	To be determined : To be determined	-	-		1.700	May 2021	-		-		-	0.000	1.700	-
<b>Subtotal</b>			-	-		1.700		-		-		-	0.000	1.700	N/A
Support (\$ in Millions)				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
Combat Capabilities Development Command, Armaments Center (CCDC, AC) Support	MIPR	Picatinny Arsenal : New Jersey	-	-		0.741	May 2021	-		-		-	0.000	0.741	-
Combat Capabilities Development Command (CCDC) Army Research Lab (ARL)	MIPR	CCDC Army Research Lab (ARL) : Aberdeen, Maryland	-	-		0.640	May 2021	-		-		-	0.000	0.640	-
<b>Subtotal</b>			-	-		1.381		-		-		-	0.000	1.381	N/A
Test and Evaluation (\$ in Millions)				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
Pre-Production Qualification Testing (PPQT)	MIPR	US Army Test Center (ATC) : Aberdeen, Maryland	-	-		0.500	May 2021	-		-		-	0.000	0.500	-
Design Verification Testing	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.350	May 2021	-		-		-	0.000	0.350	-
<b>Subtotal</b>			-	-		0.850		-		-		-	0.000	0.850	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 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC)				
	<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>	
<b>Project Cost Totals</b>	-	-	3.931		-	-	-	0.000	3.931	N/A	

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC)

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	
APTC Materiel Development Decision (MDD)	▲ 1 APTC MDD																												
APTC Concept & Prototype Development		■	■	■																									
APTC Design Verification Test (DVT) 1		■																											
APTC Preliminary Design Review (PDR)				▲ 2 APTC PDR																									
APTC Milestone B					▲ 3 APTC MS-B																								
APTC Engineering & Manufacturing Development (EMD)						■	■	■																					
APTC Design Verification Test (DVT) 2							■																						
APTC Pre-Production Qualification Testing (PPQT)											■																		
APTC Engineering & Manufacturing Development (EMD) Continuation Decision Point																							▲ 4 EMD Continue Decision Point						

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
APTC Materiel Development Decision (MDD)	1	2020	1	2020
APTC Concept & Prototype Development	1	2020	1	2021
APTC Design Verification Test (DVT) 1	2	2020	3	2020
APTC Preliminary Design Review (PDR)	4	2020	4	2020
APTC Milestone B	1	2021	1	2021
APTC Engineering & Manufacturing Development (EMD)	2	2021	4	2021
APTC Design Verification Test (DVT) 2	2	2021	3	2021
APTC Pre-Production Qualification Testing (PPQT)	4	2021	4	2021
APTC Engineering & Manufacturing Development (EMD) Continuation Decision Point	4	2021	4	2021

**Note**

Note:  
All-Purpose Tactical Cartridge (APTC)

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EU6 / 155mm HE Rocket Assist Project Extended Range			
<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>
EU6: 155mm HE Rocket Assist Project Extended Range	-	18.804	51.095	27.655	-	27.655	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The 155 millimeter (mm) High Explosive (HE) Rocket Assisted Projectile, Extended Range Project supports projectile development efforts to achieve ranges of 40km in current 39 caliber artillery weapon systems and longer ranges in future 58 caliber Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH) to achieve the Army's requirement of extended range lethality. The Project is executing an evolutionary approach consisting of two parallel efforts to meet the objectives of extended range and precision. The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1113 Extended Range (ER) will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA. These efforts will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. Fiscal Year (FY) 2022 funding will support the completion of activities to ensure that the XM1113 is safe, suitable and operationally effective in current artillery systems, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and the continuation of ERCA compatibility efforts. FY 2022 funding will also support ongoing XM1113ER development and qualification activities to directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> 155mm High Explosive Rocket Assisted Projectile (RAP) Extended Range	8.804	30.095	27.655
<b>Description:</b> The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1113 Extended Range (ER), previously known as XM1113E1, will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA.			
<b>FY 2021 Plans:</b> Fiscal Year (FY) 2021 funding supports XM1113 Urgent Materiel Release (UMR) activities including fire control software integration and development and qualification testing for current artillery systems. FY 2021 funding also supports XM1113ER development activities to achieve the Army's requirement of extended range lethality with precision accuracy.			
<b>FY 2022 Plans:</b> FY 2022 funding will support the completion of activities to ensure that the XM1113 is safe, suitable and operationally effective in current artillery systems, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and the continuation of ERCA compatibility efforts. FY 2022 funding will also support ongoing XM1113ER development and qualification			



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU6 / 155mm HE Rocket Assist Project Extended Range
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
activities to directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in funding in FY 2022 due to the reduction in contract costs associated with the XM1113 hardware required to support qualification activities.			
<b>Accomplishments/Planned Programs Subtotals</b>	8.804	30.095	27.655

	<b>FY 2020</b>	<b>FY 2021</b>
<b>Congressional Add:</b> Precision Guidance Aft	10.000	21.000
<b>FY 2020 Accomplishments:</b> FY 2020 Congressional Add effort leverages existing 155mm projectile components and technology to develop an extended range 155mm all-up round, Precision Guidance Aft.		
<b>FY 2021 Plans:</b> FY 2021 Congressional Add is supporting the continuation of Precision Guidance Aft development culminating in a demonstration planned for 4QFY21.		
<b>Congressional Adds Subtotals</b>	10.000	21.000

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• E66501: PROJ, 155mm ARTY HE RAP, XM1113	20.000	26.972	51.098	-	51.098	-	-	-	-	-	-

**Remarks**  
A Procurement of Ammunition, Army (PAA) budget line item, Standard Study Number E66501, has been established to resource the procurement of XM1113 and XM1113ER quantities.

**D. Acquisition Strategy**

The 155mm HE Rocket Assisted Projectile, Extended Range Project is utilizing a DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiative with GD-OTS to support the accelerated timeline to develop and qualify the XM1113 for 39 caliber weapon systems as well as 58 caliber Extended Range Cannon Artillery (ERCA) compatibility efforts. A separate DOTC OTA initiative with GD-OTS is being utilized for XM1113ER development and qualification activities required to achieve ranges of 70km and greater with ERCA. The Project will complete XM1113ER qualification efforts in support of Safety Release for First Unit Issued (FUI) for the ERCA Increased Range Operational Assessment. The Project is also utilizing a Cornerstone OTA with Northrop Grumman Defense Systems (NGDS) to develop and evaluate Precision Guidance Aft. The XM1113 and XM1113ER efforts will transition to Federal Acquisition Regulation (FAR) based production contracts in support of Milestone C for Low Rate Initial Production (LRIP) and Full Rate Production (FRP).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EU6 / 155mm HE Rocket Assist Project Extended Range							
Management Services (\$ in Millions)				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
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	1.448	0.125	Oct 2019	0.100	Jul 2021	0.100	Oct 2021	-		0.100	0.000	1.773	-
<b>Subtotal</b>			1.448	0.125		0.100		0.100		-		0.100	0.000	1.773	N/A
Product Development (\$ in Millions)				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
DOTC - XM1113 and XM1113ER Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology Consortium Other Transaction Agreement (DOTC OTA) : Various	37.639	8.110	Nov 2019	22.965	Nov 2020	19.487	Nov 2021	-		19.487	0.000	88.201	-
Cornerstone - Precision Guidance Aft Development - Congressional Add	MIPR	Cornerstone OTA : Northrup Grumman Defense Systems	-	7.436	Aug 2020	18.732	Jun 2021	-		-		-	0.000	26.168	-
<b>Subtotal</b>			37.639	15.546		41.697		19.487		-		19.487	0.000	114.369	N/A
Support (\$ in Millions)				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
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	4.455	1.289	Mar 2020	1.798	Mar 2021	2.818	Nov 2021	-		2.818	0.000	10.360	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU6 / 155mm HE Rocket Assist Project Extended Range
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<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			
Fire Control Software Integration	MIPR	U.S. Army Communications-Electronics Command (CECOM) : Aberdeen, MD	0.200	-		-		-		-		-	0.000	0.200	-
<b>Subtotal</b>			4.655	1.289		1.798		2.818		-		2.818	0.000	10.560	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			
Water Pit Testing	MIPR	Army Research Lab (ARL) : Adelphi, MD	0.600	-		-		-		-		-	0.000	0.600	-
Qualification Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	1.741	0.924	Jun 2020	7.500	Jan 2021	4.650	Mar 2022	-		4.650	0.000	14.815	-
Arena Testing	MIPR	Army Test and Evaluation Command (ATEC) Aberdeen Proving Ground (APG) : Aberdeen, MD	0.801	0.507	Sep 2020	-		0.600	Jun 2022	-		0.600	0.000	1.908	-
Material Testing	MIPR	National Technical Systems (NTS) : Camden, AR	0.062	0.144	Sep 2020	-		-		-		-	0.000	0.206	-
Material Testing	MIPR	Naval Air Warfare Center (NAWC) : China Lake, CA	-	0.130	Nov 2020	-		-		-		-	0.000	0.130	-
Material and Setback Testing	MIPR	Naval Surface Warfare Center	-	0.139	Nov 2020	-		-		-		-	0.000	0.139	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU6 / 155mm HE Rocket Assist Project Extended Range

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
<b>XM1113 High Explosive Rocket Assisted Projectile</b>																												
Lethality Testing	█																											
XM1113 HE RAP Engineering Manufacturing Development (EMD)	█																											
39 cal Qualification	█																											
39 cal Safety and Robustness Improvement Activities	█																											
39 cal Critical Design Review (CDR)	█																											
39 cal Urgent Materiel Release (UMR) Deliveries	█																											
39 cal Milestone C	█																											
39 cal Full Materiel Release (FMR)	█																											
<b>XM1113ER HE RAP Extended Range</b>																												
XM1113ER HE RAP Extended Range EMD	█																											
XM1113ER Development Testing	█																											
XM1113ER Preliminary Design Review (PDR)	█																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU6 / 155mm HE Rocket Assist Project Extended Range

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	
XM1113ER Critical Design Review (CDR)									4 ▲ XM1113ER CDR																				
XM1113ER Milestone B									5 ▲ XM1113ER MS-B																				
XM1113ER UMR and Safety Testing													■ XM1113ER UMR and Safety Testing																
XM1113ER SR Deliveries																	■ SR Deliveries												
Safety Release (SR) for ERCA Increased Range (IR) First Unit Issued (FUI)																	7 ▲ SR for ERCA IR FUI												
ERCA System of Systems (SoS) Operational Assessment (OA)																	■ ERCA SoS OA												
XM1113ER UMR																	9 ▲ XM1113ER UMR												
XM1113ER FMR Qualification Testing																					■ XM1113ER FMR Qual Testing								
XM1113ER Milestone C																									10 ▲ XM1113ER MS-C				
<b>Precision Guidance Aft (PG-Aft) - Congressional Add</b>																													
PG-Aft Development													■ PG-Aft Development																
PG-Aft Demonstration									3 ▲ PG-Aft Demo																				

**Note**  
XM1113 will achieve lethality against targets at 40km range. XM1113ER will achieve 70+km out of ERCA.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EU6 / <i>155mm HE Rocket Assist Project Extended Range</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
XM1113 High Explosive Rocket Assisted Projectile	1	2019	4	2023
Lethality Testing	1	2019	1	2020
Materiel Development Decision (MDD)	4	2019	4	2019
XM1113 HE RAP Engineering Manufacturing Development (EMD)	4	2019	1	2023
39 cal Qualification	4	2019	4	2023
39 cal Safety and Robustness Improvement Activities	1	2021	1	2023
39 cal Critical Design Review (CDR)	4	2021	4	2021
39 cal Urgent Materiel Release (UMR) Deliveries	4	2022	2	2024
39 cal Milestone C	1	2023	1	2023
39 cal Full Materiel Release (FMR)	1	2024	1	2024
XM1113ER HE RAP Extended Range	3	2021	4	2023
XM1113ER HE RAP Extended Range EMD	2	2020	4	2025
XM1113ER Development Testing	1	2021	2	2022
XM1113ER Preliminary Design Review (PDR)	2	2021	2	2021
XM1113ER Critical Design Review (CDR)	2	2022	2	2022
XM1113ER Milestone B	2	2022	2	2022
XM1113ER UMR and Safety Testing	4	2022	4	2023
XM1113ER SR Deliveries	4	2023	3	2024
Safety Release (SR) for ERCA Increased Range (IR) First Unit Issued (FUI)	4	2023	4	2023
ERCA System of Systems (SoS) Operational Assessment (OA)	1	2024	4	2024
XM1113ER UMR	1	2024	1	2024
XM1113ER FMR Qualification Testing	1	2025	3	2025

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU6 / 155mm HE Rocket Assist Project Extended Range
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Events	Start		End	
	Quarter	Year	Quarter	Year
XM1113ER Milestone C	4	2025	4	2025
Precision Guidance Aft (PG-Aft) - Congressional Add	1	2020	4	2021
PG-Aft Development	1	2020	4	2021
PG-Aft Demonstration	4	2021	4	2021



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions
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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
EU7: Enhanced Lethality Cannon Munitions	-	8.362	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Enhanced Lethality Cannon Munitions (ELCM) Project will evaluate, develop, and qualify new lethality technologies for 155 millimeter (mm) cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to production. The ELCM Project supports testing and assessment of the Israeli Military Industries (IMI) Systems M999 advanced anti-personnel munition in support the Army Directed Requirement for a Rapid Bridging Solution for the replacement of the 155mm Dual Purpose Improved Conventional Munition (DPICM). This Project also accelerates the qualification of the 155mm XM1128 High Explosive Projectile, which will replace the M795 Critical Munition once qualified. Engineering efforts are ongoing and will support the evaluation of the XM1128 test data to determine that the Program is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C in Fiscal Year (FY) 2021. In FY 2022, this Project does not have a Research Development Technology & Evaluation (RDT&E) request.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> 155mm XM1128 High Explosive Projectile	8.362	-	-
<b>Description:</b> Evaluate, Develop, and Qualify Enhanced Lethality Technologies.			
<b>Accomplishments/Planned Programs Subtotals</b>	8.362	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• E67802: PROJ, 155mm ARTY HE-BB, XM1128	-	15.000	12.961	-	12.961	-	-	-	-	-	-

**Remarks**

In FY 2020, XM1128 is transitioning to production. A Procurement of Ammunition, Army (PAA) funding line, Standard Study Number (SSN) E67802, PROJ, 155mm ARTY HE-BB, XM1128, has been established.

**D. Acquisition Strategy**

The XM1128 High Explosive munition has been accelerated for qualification, per the Army Directed Requirement for a Rapid Bridging Solution for the 155mm DPICM as of 22 December 2016, as an inherent part of the Rapid Bridging solution for 155mm DPICM. Prototyping was awarded in 1st Quarter (1Q) FY 2018 through Department of Defense (DoD) Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives to multiple vendors (subcontractors to United States (U.S.))

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> EU7 / <i>Enhanced Lethality Cannon Munitions</i>

Government system integrator) through Engineering & Manufacturing Development (EMD). The U.S. Government will lead EMD efforts to complete development by end 4Q FY 2020. Milestone C approval is in 2Q FY 2021. Following Milestone C, the XM1128 will be competed via Federal Acquisition Regulation (FAR) based contracts for Load, Assemble, and Pack (LAP) and metal parts in support of Low Rate Initial Production (LRIP) and follow-on production activities. Full Material Release (FMR) is planned for 1Q FY 2022.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EU7 / Enhanced Lethality Cannon Munitions								
<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	
Enhanced Lethality Cannon Munitions (ELCM) Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.487	0.149	Oct 2019	-		-		-		-	0.000	0.636	-	
<b>Subtotal</b>			0.487	0.149		-		-		-		-	0.000	0.636	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	
XM1128 Prototype Qualification Test (PQT) Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	13.378	2.935	Dec 2019	-		-		-		-	0.140	16.453	-	
XM1128 Prototype Qualification Test (PQT) Hardware	Reqn	Cornerstone Other Transaction Agreement (OTA) : Various	2.185	0.891	Mar 2020	-		-		-		-	0.000	3.076	-	
XM1113 Prototype Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	4.494	-		-		-		-		-	0.000	4.494	-	
<b>Subtotal</b>			20.057	3.826		-		-		-		-	0.140	24.023	N/A	
<b>Support (\$ 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	
XM1128 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center	7.426	2.812	Mar 2020	-		-		-		-	1.377	11.615	-	

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions
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<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			
		(CCDC AC) : Picatinny Arsenal, NJ													
XM1128 Firing Table Software Updates	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Adelphi, MD	2.123	-		-		-		-		-	0.000	2.123	-
M999 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	0.750	-		-		-		-		-	0.000	0.750	-
XM1113 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	0.606	-		-		-		-		-	0.000	0.606	-
<b>Subtotal</b>			10.905	2.812		-		-		-		-	1.377	15.094	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			
XM1128 Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	3.089	1.500	Jan 2020	-		-		-		-	0.000	4.589	-
XM1128 Testing	MIPR	Naval Surface Warfare Center	1.500	0.075	Jun 2020	-		-		-		-	0.000	1.575	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions

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
<b>XM1128</b>																												
XM1128 Performance Qualification Testing (PQT)	[Redacted]																											
	XM1128 PQT																											
XM1128 Baseline Prototyping	[Redacted]																											
	XM1128 Baseline Prototyping																											
XM1128 Milestone C					1																							
					XM1128 MS-C																							
XM1128 Full Materiel Release (FMR)													2															
													XM1128 FMR															

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU7 / Enhanced Lethality Cannon Munitions

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
XM1128	3	2017	1	2021
XM1128 Prototyping	3	2017	4	2019
XM1128 Milestone B	1	2018	1	2018
XM1128 Lethality Testing and Assessment	4	2017	4	2019
XM1128 Critical Design Review (CDR)	2	2019	2	2019
XM1128 Performance Qualification Testing (PQT)	2	2019	3	2020
XM1128 Baseline Prototyping	4	2019	3	2020
XM1128 Milestone C	2	2021	2	2021
XM1128 Full Materiel Release (FMR)	1	2023	1	2023
M999	4	2018	4	2019
M999 Testing	4	2018	4	2019

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze			
<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>
EU8: Improved Multi-Option Fuze	-	9.589	7.700	4.562	-	4.562	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Improved Multi-Option Fuze Project is a technology refresh and modernization effort that provides an incremental capability with technology advancements and performance improvements on the current non-precision artillery and mortar ammunition proximity multi-option fuze that will increase robustness to electronic countermeasures (ECM), eliminates the susceptibility of reverse engineering (RE), incorporates power source advancements, improves delay mode reliability, and integrates safe & arm improvements. This Project will develop and qualify safe, affordable, reliable, Proximity Height of Burst fuzing solutions with robust Defense Exportability Features (DEF) for non-precision conventional cannon artillery and mortar munitions that are resistant to adversary exploitation via ECM and RE threats. Fiscal Year (FY) 2022 funding will support the completion of Multi-Option Fuze Artillery (MOFA) II and Improved Multi-Option Fuze Mortar (iMOFM) hardware fabrication required for design verification and qualification testing. Funding will also support engineering efforts to evaluate test data to ensure that MOFA II and iMOFM are safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Improved Multi-Option Fuze Development	9.589	7.700	4.562
<b>Description:</b> Develop and qualify improved multi-option fuze technologies.			
<b>FY 2021 Plans:</b> FY 2021 funding supports MOFA II and iMOFM design verification, hardware fabrication, qualification testing, and Fuze Qualification Testing.			
<b>FY 2022 Plans:</b> FY 2022 funding will support the completion of Multi-Option Fuze Artillery (MOFA) II and Improved Multi-Option Fuze Mortar (iMOFM) hardware fabrication required for design verification and qualification testing. Funding will also support engineering efforts to evaluate test data to ensure that MOFA II and iMOFM are safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in funding in FY 2022 due to the reduction in contract costs associated with the design and fabrication of MOFA II and iMOFM hardware to support qualification testing.			
<b>Accomplishments/Planned Programs Subtotals</b>	9.589	7.700	4.562



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	Total Cost
			Base	OCO	Total					Complete	
• E99909: Multi-Option Fuze, Artillery M782	-	-	13.653	-	13.653	-	-	-	-	-	-

**Remarks**

FY 2022 Procurement of Ammunition, Army (PAA) funding will be executed on Standard Study Number (SSN) E99909, Multi-Option Fuze, Artillery (MOFA) M782 for the procurement of legacy MOFA fuzes.

**D. Acquisition Strategy**

The Improved Multi-Option Fuze Project currently utilizes the DoD Ordnance Technology Consortium Other Transaction Agreement (DOTC OTA) with incrementally funded Engineering and Manufacturing Development (EMD) contracts for improved and modernized Multi-Option Fuze Artillery (MOFA) II detailed designs and the fabrication of hardware through FY 2022. The Improved Multi-Option Fuze Project will enhance the existing multi-option fuzes for cannon artillery and mortar munitions programs of record. Detailed government-owned Technical Data Packages (TDPs) will enable "build to print" designs to facilitate competitive Federal Acquisition Regulation (FAR) based contracting for procurement. Qualified MOFA II will be a Technology Readiness Level 8 (TRL-8) TC design with a mature technical design packages for production. Parallel Improved Multi-Option Fuze Mortar (iMOFM) effort will be a qualified TRL-8 design for incorporation into mortar cartridge production.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	1.033	-		-		-		-		-	0.000	1.033	-
<b>Subtotal</b>			1.033	-		-		-		-		-	0.000	1.033	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
MOFA II Development & PQT Support	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	5.395	6.075	Dec 2019	2.014	Jan 2021	0.350	Nov 2021	-		0.350	0.000	13.834	-
iMOFM Fuze Test Hardware & Qualification	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	0.595	1.737	Apr 2020	1.100	Apr 2021	0.645	Jan 2022	-		0.645	0.000	4.077	-
<b>Subtotal</b>			5.990	7.812		3.114		0.995		-		0.995	0.000	17.911	N/A

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	2.676	1.260	Nov 2019	1.103	Nov 2020	1.217	Nov 2021	-		1.217	0.000	6.256	-
Fuze Engineering Support	C/LH	SAVIT Corporation : Rockaway, NJ	-	-		0.300	Mar 2021	0.150	May 2022	-		0.150	0.000	0.450	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EU8 / Improved Multi-Option Fuze							
Support (\$ in Millions)				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
<b>Subtotal</b>			2.676	1.260		1.403		1.367		-		1.367	0.000	6.706	N/A
Test and Evaluation (\$ in Millions)				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
Improved Multi-Option Fuze Test and Evaluations	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		0.083	Mar 2021	0.250	Dec 2021	-		0.250	0.000	0.333	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.402	0.062	Jun 2020	1.750	Mar 2021	1.250	Jan 2022	-		1.250	0.000	3.464	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	U.S. Army Research Lab (ARL) : Adelphi, MD	0.300	0.100	Jan 2020	-		-		-		-	0.000	0.400	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	Army Test and Evaluation Command (ATEC) Aberdeen Proving Ground (APG) : Aberdeen, MD	-	0.040	Oct 2020	0.250	May 2021	0.120	Nov 2021	-		0.120	0.000	0.410	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	White Sands Missile Range (WSMR) : White Sands, NM	-	0.315	Sep 2020	0.750	Mar 2021	0.330	Dec 2021	-		0.330	0.000	1.395	-
Improved Multi-Option Fuze Cyber Security Testing	MIPR	TBD : TBD	-	-		0.350	Mar 2021	0.250	Mar 2022	-		0.250	0.000	0.600	-
<b>Subtotal</b>			0.702	0.517		3.183		2.200		-		2.200	0.000	6.602	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze
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Test and Evaluation (\$ in Millions)				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**  
Cyber Security testing for MOFA II is required during Fiscal Year (FY) 2021 and FY 2022. The test location will be determined based on informed requirements by March 2021.

	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>	10.401	9.589	7.700	4.562	-	4.562	0.000	32.252	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze

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
<b>MOFA II</b>																												
Fabricate MOFA II System Level Qualification Hardware																												
MOFA II Safety, Reliability, Environmental, Qualification Testing																												
MOFA II Milestone C																												
<b>iMOFM</b>																												
Fabricate iMOFM System Level Qualification Hardware																												
iMOFM Qualification Testing																												
iMOFM Engineering Change Proposal (ECP)																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EU8 / Improved Multi-Option Fuze

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Fabricate Prototypes	3	2018	3	2019
Conduct Evaluations and Design Reviews	2	2019	4	2019
MOFA II	3	2019	4	2022
Fabricate MOFA II System Level Qualification Hardware	2	2020	4	2021
MOFA II Safety, Reliability, Environmental, Qualification Testing	1	2021	3	2022
MOFA II Milestone C	3	2022	3	2022
iMOFM	2	2020	4	2022
Fabricate iMOFM System Level Qualification Hardware	3	2020	2	2022
iMOFM Qualification Testing	4	2021	3	2022
iMOFM Engineering Change Proposal (ECP)	4	2022	4	2022

**Note**

Multi-Option Fuze Artillery (MOFA)  
improved Multi-Option Fuze Mortar (iMOFM)

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

<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition			
<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>
EW1: 40mm Low Velocity Ammunition	-	13.454	21.659	3.640	-	3.640	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The 40 millimeter (mm) Low Velocity High Explosive Air Burst (HEAB) is a new capability identified as a Warfighter requirement in the Capability Development Document (CDD), 40mm Low Velocity (LV) Family of Ammunition Annex. The HEAB tactical cartridge allows the Warfighter to engage targets at increased effective ranges using the 40mm M320 Grenade Launcher. The HEAB cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges resulting in increased soldier survivability. FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3).

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> 40mm LV HEAB, XM1166	13.454	21.659	3.640
<b>Description:</b> Engineering Manufacturing Development (EMD) of the 40mm LV HEAB munition.			
<b>FY 2021 Plans:</b> FY 2021 will support the remaining DET 3 build and test, Critical Design Review, Test Readiness Reviews (TRR) and hardware build for Development Test and Evaluation.			
<b>FY 2022 Plans:</b> FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3).			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> n/a			
<b>Accomplishments/Planned Programs Subtotals</b>			3.640

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

Line Item	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
• E71005: CTG, 40MM, LV HEAB, XM1166	-	-	10.500	-	10.500	-	-	-	-	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

The HEAB cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) Program. Potential designs were evaluated as part of the pre-EMD activities using a Cooperative Research and Development Agreement (CRADA) with contractors. For EMD, the Government awarded two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC). The EMD phase will consist of a series of Design Engineering Tests (DET) to assess the Contractors' design progress and ability of achieving the program objectives. Any shortcomings and deficiencies will be addressed prior to final Developmental Test & Evaluation (DT&E). After DT&E and a successful Milestone C, the Government will down-select to a single contractor for Low Rate Initial Production (LRIP) and four production year options utilizing a follow-on Federal Acquisition Regulation (FAR) based contract.



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition
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<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
LV HEAB XM1166 Contractor 1	C/CPFF	Day & Zimmerman, Inc (DZI) : Middletown, IA	7.367	7.112	Oct 2019	9.540	Jan 2021	1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
LV HEAB XM1166 Contractor 2	C/CPFF	Chemring Ordnance, Inc : Perry, FL	7.176	4.064	Oct 2019	9.540	Jan 2021	1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
<b>Subtotal</b>			14.543	11.176		19.080		2.000		-		2.000	Continuing	Continuing	N/A

<b>Support (\$ 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
LV HEAB XM1166 - Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	2.314	1.490	Oct 2019	1.479	Jan 2021	0.700	Nov 2021	-		0.700	Continuing	Continuing	Continuing
LV HEAB XM1166 - Lethality Analysis	MIPR	Combat Capabilities Development Command Data & Analysis Center (DAC) : Aberdeen Proving Ground, Md	-	-		-		0.100	Nov 2021	-		0.100	0.000	0.100	-
<b>Subtotal</b>			2.314	1.490		1.479		0.800		-		0.800	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 Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
LV HEAB XM1166 Design Engineering Test (DET) 1	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	0.660	-		-		-		-		-	0.000	0.660	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition
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<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			
LV HEAB XM1166 Design Engineering Test (DET) 2	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	0.788	Feb 2020	-		-		-		-	0.000	0.788	-
LV HEAB XM1166 Design Engineering Test (DET) 3	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		1.100	Jan 2021	-		-		-	0.000	1.100	-
LV HEAB XM1166 Developmental Test and Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		-		0.740	Dec 2021	-		0.740	0.000	0.740	-
Soldier Touch Point 3 (STP 3)	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		-		0.100	Apr 2022	-		0.100	0.000	0.100	-
<b>Subtotal</b>			0.660	0.788		1.100		0.840		-		0.840	0.000	3.388	N/A

	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>	17.517	13.454	21.659	3.640	-	3.640	Continuing	Continuing	N/A

**Remarks**  
Notes:  
Low Velocity (LV)  
High Explosive Air Burst (HEAB)

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition

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				
40mm HEAB XM1166 Engineering Manufacturing Development	[Blue bar]																															
	HEAB EMD																															
40mm HEAB XM1166 Design Engineering Test DET 1	[Blue bar]																															
	HEAB DET 1																															
40mm Soldier Touch Point 1 (STP1)	[Blue bar]																															
	STP1																															
40mm HEAB XM1166 Design Engineering Test DET 2					[Blue bar]																											
					HEAB DET 2																											
40mm Soldier Touch Point 2 (STP2)					[Blue bar]																											
					STP2																											
40mm HEAB XM1166 Critical Design Review					[Blue triangle]																											
					HEAB CDR																											
40mm HEAB XM1166 Design Engineering Test DET 3					[Blue bar]																											
					HEAB DET 3																											
40mm HEAB XM1166 DT&E									[Blue bar]																							
									HEAB DT&E																							
40mm Soldier Touch Point 3 (STP3)									[Blue bar]																							
									STP3																							
40mm HEAB XM1166 Milestone C													[Blue triangle]																			
													HEAB MS-C																			
40mm HEAB XM1166 Low Rate Initial Production													[Blue bar]																			
													HEAB LRIP																			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> EW1 / 40mm Low Velocity Ammunition

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
40mm HEAB XM1166 Cooperative Research & Development Agreement (CRADA) Testing	3	2017	1	2018
40mm HEAB XM1166 Milestone B	4	2018	4	2018
40mm HEAB XM1166 Engineering Manufacturing Development	4	2018	4	2022
40mm HEAB XM1166 Preliminary Design Review	2	2019	2	2019
40mm HEAB XM1166 Design Engineering Test DET 1	1	2020	2	2020
40mm Soldier Touch Point 1 (STP1)	1	2020	2	2020
40mm HEAB XM1166 Design Engineering Test DET 2	4	2020	2	2021
40mm Soldier Touch Point 2 (STP2)	2	2021	2	2021
40mm HEAB XM1166 Critical Design Review	2	2021	2	2021
40mm HEAB XM1166 Design Engineering Test DET 3	3	2021	4	2021
40mm HEAB XM1166 DT&E	2	2022	3	2022
40mm Soldier Touch Point 3 (STP3)	3	2022	3	2022
40mm HEAB XM1166 Milestone C	4	2022	4	2022
40mm HEAB XM1166 Low Rate Initial Production	4	2022	4	2023

**Note**

millimeter (mm)  
 Low Velocity (LV)  
 High Explosive Air Burst (HEAB)

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FA6 / 30mm Lethality
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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
FA6: 30mm Lethality	-	26.030	19.358	8.939	-	8.939	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

The 30 millimeter (mm) Lethality project funds the development of a suite of 30x173mm caliber cartridges, which includes a XM1182 High Explosive Airburst with Trace (HEAB-T) cartridge for increased anti-personnel effects, XM1170 Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) cartridge for anti-materiel, and ballistically matched training cartridges; XM1173 Target Practice with Trace (TP-T) cartridge and XM1172 Target Practice Discarding Sabot with Trace (TPDS-T) cartridge. The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV), Next Generation Combat Vehicle (NGCV), and any Army Fighting Vehicles that are equipped with a 30x173mm weapon system. The tactical APFSDS-T cartridge will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging light-to-medium armored vehicles. The HEAB-T cartridge will provide the Warfighter with increased lethality against troops in the open, counter defilade, Anti-Tank Guided Missile (ATGM) teams, and troops behind urban structures. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This project is a follow-on of the earlier efforts in support of the United States Army Europe (USAREUR) Operational Needs Statement (ONS) #15-20590 Stryker Increased Lethality for the 2nd Cavalry Regiment (2CR). Fiscal Year (FY) 2022 funding will support the continuation of Engineering, Manufacturing and Development (EMD) for all cartridges to include Developmental Test & Evaluation (DT&E) and preparation for Milestone C decision.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> 30X173mm Armor-Piercing Fin-Stabilized Discarding Sabot Trace (APFSDS-T) and Target Practice Discarding Sabot with Trace (TPDS-T)</p> <p><b>Description:</b> Qualify 30x173mm armor piercing tactical and training cartridges for use on Stryker ICV, NGCV or other Army Future Fighting Vehicles.</p> <p><b>FY 2021 Plans:</b> FY 2021 primary activities will include prototype fabrication and Design Engineering Tests (DET).</p> <p><b>FY 2022 Plans:</b> FY 2022 primary activities will include Developmental Test &amp; Evaluation (DT&amp;E) hardware fabrication and testing and preparation for Milestone C decision.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding decreases due to cartridge component procurement starting in FY 2021. Remaining activities will only include hardware build and DT&amp;E.</p>	5.140	10.564	3.149
<p><b>Title:</b> 30x173mm HEAB-T and TP-T</p>	20.890	8.794	5.790

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FA6 / 30mm Lethality

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Develop and qualify a 30x173mm airburst cartridge and trainer for use on Stryker Infantry Combat Vehicles (ICV), Next Generation Combat Vehicles (NGCV), or other Army Future Fighting Vehicles.</p> <p><b>FY 2021 Plans:</b> FY 2021 primary activities include DET and DT&amp;E build.</p> <p><b>FY 2022 Plans:</b> FY 2022 primary activities will include DT&amp;E testing and preparation for Milestone C decision.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 funding decreases due to the cartridge build completion. FY 2022 activities will only include DT&amp;E and the preparation of Milestone C.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	26.030	19.358	8.939

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• E07610: CTG, 30MM, Progrmabl Air Burst Mun, Mk310, Linked	13.412	14.550	-	-	-	-	-	-	-	-	-
• E07306: CTG, 30mm TP-T, MK239, Single	8.528	5.997	0.823	-	0.823	-	-	-	-	-	-
• E07406: CTG, 30mm Hi Expl Incendry-T(HEI-T), Mk238 Series	5.976	8.405	-	-	-	-	-	-	-	-	-
• E09191: CTG, 30mm TPDS-T, MK317 (SABOT Trng), Single	9.200	9.012	-	-	-	-	-	-	-	-	-
• E09292: CTG, 30mm APFSDS-T, MK258, Single	21.032	14.464	-	-	-	-	-	-	-	-	-

**Remarks**  
Items listed in Other Program Funding will be updated in FY 2023 with the corresponding XM rounds as reflected in the Mission Description.

**D. Acquisition Strategy**  
30X173mm APFSDS-T and TPDS-T: Proposals were requested from Industry to develop a 30x173mm APFSDS-T anti-materiel tactical cartridge (XM1170) and a 30x173mm TPDS-T ballistically matched training cartridge (XM1172) that will meet Army Performance Specifications and Stryker Lethality Annex Requirements. The Government awarded two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC)

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</i>
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to support development, Design Engineering Tests (DET) and Developmental Test & Evaluation (DT&E) in support of Milestone C. The Government will award Federal Acquisition Regulation (FAR)-based contracts for production of each cartridge.

30x173mm HEAB-T and TP-T: In support of the approved 30mm Multi-Function Munition Capability Development Document (CDD), the 30x173mm HEAB-T cartridge (XM1182) and the ballistically matched TP-T cartridge (XM1173) will be developed to meet the requirements. The Government awarded two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC) to support development, Design Engineering Tests (DET) and Developmental Test & Evaluation (DT&E) in support of Milestone C. The Government will down-select and award a single FAR-based contract for production of the XM1182 HEAB-T cartridge, and up to two FAR based contract for the XM1173 TP-T.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FA6 / 30mm Lethality							
Product Development (\$ in Millions)				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
High Explosive Airburst with Trace (HEAB-T) TMRR Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	5.650	-		-		-		-		-	0.000	5.650	-
High Explosive Airburst with Trace (HEAB-T) TMRR Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	5.650	-		-		-		-		-	0.000	5.650	-
High Explosive Airburst with Trace (HEAB-T) EMD Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	-	8.868	May 2020	2.033	Jul 2021	0.560	Jan 2022	-		0.560	Continuing	Continuing	Continuing
High Explosive Airburst with Trace (HEAB-T) EMD Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	-	10.997	May 2020	4.066	Apr 2021	0.560	Jan 2022	-		0.560	Continuing	Continuing	Continuing
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) EMD Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	3.275	-		4.419	Jan 2021	0.280	Jan 2022	-		0.280	0.000	7.974	-
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) EMD Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	3.275	4.031	Jun 2020	4.420	Jan 2021	0.534	Jan 2022	-		0.534	0.000	12.260	-
Steel Cartridge Case Development Contract	C/CPFF	General Dynamics - Ordnance and Tactical Systems : Marion, IL	5.793	-		-		-		-		-	0.000	5.793	-
<b>Subtotal</b>			23.643	23.896		14.938		1.934		-		1.934	Continuing	Continuing	N/A



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FA6 / 30mm Lethality							
Support (\$ in Millions)				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
Engineering Support	MIPR	Combat Capabilities Development Command - Armaments Center (CCDC-AC) : Picatinny Arsenal, NJ	5.066	2.134	Jun 2020	1.850	Jan 2021	2.000	Nov 2021	-		2.000	Continuing	Continuing	Continuing
<b>Subtotal</b>			5.066	2.134		1.850		2.000		-		2.000	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
APFSDS-T Design Engineering Tests (DET)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		0.875	Feb 2021	-		-		-	0.000	0.875	-
APFSDS-T / TPSD-T Developmental Test & Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		-		1.335	Mar 2022	-		1.335	Continuing	Continuing	Continuing
High Explosive Airburst with Trace (HEAB-T) TMRR Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	1.450	-		-		-		-		-	0.000	1.450	-
HEAB-T / TP-T Developmental Test & Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		-		3.670	Jan 2022	-		3.670	0.000	3.670	-
HEAB-T Design Engineering Tests (DET)	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	-		1.695	Feb 2021	-		-		-	0.000	1.695	-
<b>Subtotal</b>			1.450	-		2.570		5.005		-		5.005	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 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> FA6 / 30mm Lethality					
	<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>
<b>Project Cost Totals</b>	30.159	26.030		19.358		8.939		-		8.939	Continuing	Continuing	N/A

**Remarks**  
 Design Engineering Tests (DET)  
 Engineering and Manufacturing Development (EMD)  
 Technology Maturation & Risk Reduction (TMRR)

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</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
30mm APFSDS-T / TPDS-T EMD	[Redacted]																											
30mm APFSDS-T DET Build	[Redacted]																											
30mm APFSDS-T / TPDS-T Design Engineering Test (DET)	[Redacted]																											
30mm APFSDS-T Critical Design Review (CDR)	[Redacted]																											
30mm APFSDS-T DT&E Hardware Build	[Redacted]																											
30mm APFSDS-T / TPDS-T Developmental Test & Evaluation (DT&E)	[Redacted]																											
30mm APFSDS-T Milestone C	[Redacted]																											
30mm APFSDS-T Low Rate Initial Production (LRIP)	[Redacted]																											
30mm APFSDS-T Live Fire Test and Evaluation (LFT&E)	[Redacted]																											
30mm TPDS-T DET Build	[Redacted]																											
30mm TPDS-T DT&E Hardware Build	[Redacted]																											
30mm TPDS-T Critical Design Review (CDR)	[Redacted]																											
30mm TPDS-T Milestone C	[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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</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
30mm HEAB-T Live Fire Test and Evaluation (LFT&E)																	<div style="background-color: blue; width: 100px; height: 15px; margin-bottom: 5px;"></div> HEAB-T LFT&E											
30mm HEAB-T Initial Operational Test and Evaluation (IOT&E)																	<div style="background-color: blue; width: 100px; height: 15px; margin-bottom: 5px;"></div> HEAB-T IOT&E											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FA6 / <i>30mm Lethality</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Material Development Decision (MDD)	3	2019	3	2019
30mm APFSDS-T / TPDS-T EMD Contract Award	4	2019	4	2019
30mm APFSDS-T / TPDS-T EMD	4	2019	1	2023
30mm APFSDS-T DET Build	2	2020	4	2020
30mm APFSDS-T / TPDS-T Design Engineering Test (DET)	3	2021	4	2021
30mm APFSDS-T Critical Design Review (CDR)	1	2022	1	2022
30mm APFSDS-T DT&E Hardware Build	1	2022	2	2022
30mm APFSDS-T / TPDS-T Developmental Test & Evaluation (DT&E)	3	2022	4	2022
30mm APFSDS-T Milestone C	1	2023	1	2023
30mm APFSDS-T Low Rate Initial Production (LRIP)	1	2023	3	2024
30mm APFSDS-T Live Fire Test and Evaluation (LFT&E)	2	2024	3	2024
30mm TPDS-T DET Build	3	2020	1	2021
30mm TPDS-T DT&E Hardware Build	1	2022	2	2022
30mm TPDS-T Critical Design Review (CDR)	1	2022	1	2022
30mm TPDS-T Milestone C	1	2023	1	2023
30mm TPDS-T Low Rate Initial Production (LRIP)	1	2023	3	2024
30mm HEAB-T TMRR Contract Awards	1	2019	1	2019
30mm HEAB-T Technology Maturation and Risk Reduction (TMRR)	1	2019	1	2020
30mm HEAB-T TMRR Engineering Test 1	3	2019	4	2019
30mm HEAB-T TMRR Engineering Test 2	4	2019	1	2020
30mm HEAB-T and TP-T Milestone B	2	2020	2	2020
30mm HEAB-T / TP-T DET Build	2	2020	2	2021

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FA6 / 30mm Lethality
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Events	Start		End	
	Quarter	Year	Quarter	Year
30mm HEAB-T and TP-T EMD Contract Award	3	2020	3	2020
30mm HEAB-T and TP-T EMD	3	2020	1	2023
30mm HEAB-T and TP-T EMD Design Engineering Test (DET)	2	2021	4	2021
30mm HEAB-T / TP-T Critical Design Review (CDR)	4	2021	4	2021
30mm HEAB-T / TP-T DT&E Build	4	2021	2	2022
30mm HEAB-T and TP-T Developmental Test & Evaluation (DT&E)	2	2022	3	2022
30mm HEAB-T and TP-T Milestone C	1	2023	1	2023
30mm HEAB-T / TP-T Low Rate Initial Production (LRIP)	2	2023	3	2024
30mm HEAB-T Live Fire Test and Evaluation (LFT&E)	2	2024	3	2024
30mm HEAB-T Initial Operational Test and Evaluation (IOT&E)	2	2024	3	2024

**Note**

- Engineering Manufacturing Development (EMD)
- Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T)
- Target Practice Discarding Sabot with Trace (TPDS-T)
- High Explosive Airburst with Trace (HEAB-T)
- Target-Practice with Trace (TP-T)
- Technology Maturation and Risk Reduction (TMRR)
- Urgent Materiel Release (UMR)
- Programmable Airburst Munition with Trace (PABM-T)

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

<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)			
<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>
FJ4: Cannon-Delivered Area Effects Munitions (C-DAEM)	-	-	26.593	89.138	-	89.138	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Cannon-Delivered Area Effects Munitions (C-DAEM) Project will provide United States (U.S.) ground forces with the capability to engage area personnel through armored targets, while denying threat forces full operational freedom within the targeted area. An Analysis of Alternatives (AoA) was completed in January 2018 to inform Army acquisition and investment decisions regarding replacement of the current stockpile of 155 millimeter (mm) Dual Purpose Improved Conventional Munitions (DPICM) with Department of Defense (DoD) policy compliant munitions and address anti-armor and extended range capability requirements. The Army validated two materiel solutions for C-DAEM to be pursued in parallel to support the Army's modernization priorities; C-DAEM Armor and C-DAEM DPICM Replacement. C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. Fiscal Year (FY) 2022 funding will support the continued development and testing of the most promising C-DAEM Armor candidates(s) for Urgent Materiel Release (UMR), and engineering efforts required to integrate the NavStorm-M Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s). C-DAEM DPICM Replacement will destroy personnel to soft-skinned targets. On 11 September 2020, the Army approved the Israeli M999 advanced anti-personnel munition as the C-DAEM DPICM Replacement solution. FY 2022 funding will also support M999 testing and qualification activities to ensure effectiveness, suitability and survivability.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> C-DAEM Armor</p> <p><b>Description:</b> C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks.</p> <p><b>FY 2022 Plans:</b> FY 2022 funding will support the continued development and testing of the most promising C-DAEM Armor candidates(s) for Urgent Materiel Release (UMR) and engineering efforts required to integrate the NavStorm-M Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase in funding in FY 2022 due to transition of C-DAEM Armor from PE 0603639A, Project FG1, Cannon-Delivered Area Effects Munitions in accordance with the completion of C-DAEM Armor competitive demonstration phase and risk reduction activities and initiation of development and qualification efforts for selected solution(s) to support UMR.</p>	-	-	83.056
<p><b>Title:</b> C-DAEM DPICM Replacement</p> <p><b>Description:</b> C-DAEM DPICM Replacement will destroy personnel to soft-skinned vehicles.</p>	-	26.593	6.082



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>FY 2021 Plans:</b> FY 2021 funding supports the acquisition of M999 hardware and initiation of testing and qualification activities to support the Army's modernization priorities.			
<b>FY 2022 Plans:</b> FY 2022 funding will support M999 testing and qualification activities to ensure effectiveness, suitability and survivability.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in funding due to the completion of initial M999 test and qualification activities.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	26.593	89.138

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• FG1: Cannon-Delivered Area Effects Munitions (C-DAEM)	20.564	38.466	-	-	-	-	-	-	-	-	-
• E68603: PROJ, ARTY, 155MM C-DAEM INCREMENT 1	-	-	-	-	-	-	-	-	-	-	-

**Remarks**  
Project FJ4 Cannon-Delivered Area Effects Munitions (C-DAEM) transitions from BA 4 PE 0603639A Tank and Medium Caliber Ammunition Project FG1 C-DAEM. In FY 2022, Project FJ4 is not a New Start.

A Procurement of Ammunition, Army (PAA) funding line for C-DAEM Armor, Standard Study Number (SSN), E68603, PROJ, ARTY, 155MM C-DAEM INCREMENT 1, has been established. A PAA funding line for C-DAEM DPICM Replacement, SSN E68604, PROJ, ARTY, 155MM C-DAEM INCREMENT 2, has been established.

**D. Acquisition Strategy**  
C-DAEM will employ an evolutionary acquisition approach to efficiently transition the unique ammunition products as they become available. The Analysis of Alternatives (AoA) completed on 31 January 2018 qualified a significant enhancement of operational fires effectiveness, efficiency, and maneuver support when cannon artillery was equipped with a dedicated extended range anti-armor projectile. The U.S. Government is currently reducing risk by executing prototype testing and evaluation efforts, while utilizing the AoA results to shape the selection criteria. In FY 2021, C-DAEM Armor is using the selection criteria to sponsor competitive demonstrations for C-DAEM Armor to streamline the acquisition process. At the initiation of C-DAEM Armor Engineering Manufacturing and Development (EMD), the U.S. Government will select the most promising candidate(s) that will address medium to heavy armored targets in support of an Urgent Materiel Release (UMR) and follow on Full Materiel Release (FMR). C-DAEM Armor will use the Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) to further support the continued development and testing of the selected C-DAEM Armor candidate(s) in FY 2022 in accordance with the decisions granted at the Army Requirements Oversight

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FJ4 / <i>Cannon-Delivered Area Effects Munitions (C-DAEM)</i>
<p>Council (AROC) in April 2018. C-DAEM Armor will also utilize DOTC OTAs to complete development and qualification activities, including the NavStorm-M Global Positioning System (GPS) Receiver integration efforts, in support of Milestone C for Low Rate Initial Production (LRIP) and Full Rate Production (FRP). C-DAEM DPICM Replacement is utilizing a Combating Terrorism Technical Support Office (CTTSO) task plan with Israel Ministry of Defense (IMOD) to deliver M999 hardware in support of qualification activities.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)							
Management Services (\$ in Millions)				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
Program Management	Various	Office of the Project Manager Combat Ammunition Systems (PM CAS) : Picatinny Arsenal, NJ	-	-		0.050	Jul 2021	0.450	Oct 2021	-		0.450	0.000	0.500	-
<b>Subtotal</b>			-	-		0.050		0.450		-		0.450	0.000	0.500	N/A
Product Development (\$ in Millions)				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
DOTC - Armor Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology Consortium (DOTC) : Picatinny Arsenal, NJ	-	-		-		67.000	Nov 2021	-		67.000	0.000	67.000	-
DOTC - Armor NavStorm-M GPS Receiver Integration	MIPR	DoD Ordnance Technology Consortium (DOTC) : Picatinny Arsenal, NJ	-	-		-		7.780	Nov 2021	-		7.780	0.000	7.780	-
CTTSO - DPICM Replacement Hardware	MIPR	Combating Terrorism Technical Support Office (CTTSO) : Israel Ministry of Defense (IMOD)	-	-		16.904	Mar 2021	-		-		-	0.000	16.904	-
<b>Subtotal</b>			-	-		16.904		74.780		-		74.780	0.000	91.684	N/A
Support (\$ in Millions)				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
Engineering Support	MIPR	Combat Capabilities Development Command	-	-		3.694	Nov 2020	6.748	Nov 2021	-		6.748	0.000	10.442	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)
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<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
		Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ													
Fire Control Software Update	MIPR	Multiple : Various	-	-		2.469	May 2021	4.160	May 2022	-		4.160	0.000	6.629	-
<b>Subtotal</b>			-	-		6.163		10.908		-		10.908	0.000	17.071	N/A

**Remarks**  
Additional support required in FY 2022 due to the initiation of C-DAEM Armor Engineering Manufacturing and Development (EMD) activities.

<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Armor Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	-		-		1.500	Mar 2022	-		1.500	0.000	1.500	-
DPICM Replacement Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	-		3.476	Mar 2021	1.500	Mar 2022	-		1.500	0.000	4.976	-
<b>Subtotal</b>			-	-		3.476		3.000		-		3.000	0.000	6.476	N/A

<b>Project Cost Totals</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>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	-	-	26.593	89.138	-	89.138	0.000	115.731	N/A

**Remarks**  
C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. C-DAEM Dual Purpose Improved Conventional Munition (DPICM) Replacement will destroy personnel to soft-skinned vehicles. C-DAEM Armor and DPICM Replacement are being pursued in parallel to support the Army's modernization priorities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army							Date: May 2021			
Appropriation/Budget Activity			R-1 Program Element (Number/Name)			Project (Number/Name)				
2040 / 5			PE 0604802A / Weapons and Munitions - Eng Dev			FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)				
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	
In FY 2022, C-DAEM Armor development activities transition from BA 4 PE 0603639A Tank and Medium Caliber Ammunition Project FG1 Cannon-Delivered Area Effects Munitions (C-DAEM).										

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)

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					
<b>C-DAEM Armor</b>																																	
Technology Maturation and Risk Reduction (TMRR)																																	
In Process Review (IPR) #1					1 IPR #1																												
IPR #2					2 IPR #2																												
Army Requirements Oversight Council (AROC) Decision									3 ARDC																								
Milestone B									4 MS-B																								
Engineering Manufacturing & Development (EMD)																																	
Developmental, Safety and Qual Testing																																	
NavStorm-M GPS Receiver Integration																																	
Hardware Fabrication																																	
Preliminary Design Review (PDR)									5 PDR																								
Critical Design Review (CDR)																	6 CDR																
Milestone C																									9 MS-C								

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FJ4 / Cannon-Delivered Area Effects Munitions (C-DAEM)

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
<b>C-DAEM DPICM Replacement</b>																												
Qualification and Testing.																												
Unexploded Ordnance (UXO) Decision Point (DP)																												
Milestone C.																												

Qual & Testing

7  
UXO DP

8  
MS-C

**Note**  
At the initiation of C-DAEM Armor Engineering Manufacturing and Development (EMD), the U.S. Government will select the most promising candidate(s) that will address medium to heavy armored targets in support of an Urgent Materiel Release (UMR) and follow on Full Materiel Release (FMR).

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FJ4 / <i>Cannon-Delivered Area Effects Munitions (C-DAEM)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
C-DAEM Armor	1	2022	4	2026
Technology Maturation and Risk Reduction (TMRR)	1	2020	4	2021
In Process Review (IPR) #1	1	2021	1	2021
IPR #2	2	2021	2	2021
Army Requirements Oversight Council (AROC) Decision	4	2021	4	2021
Milestone B	4	2021	4	2021
Engineering Manufacturing & Development (EMD)	1	2022	4	2026
Developmental, Safety and Qual Testing	1	2022	4	2025
NavStorm-M GPS Receiver Integration	1	2022	4	2025
Hardware Fabrication	1	2022	4	2022
Preliminary Design Review (PDR)	1	2022	1	2022
Critical Design Review (CDR)	3	2022	3	2022
Milestone C	1	2026	1	2026
C-DAEM DPICM Replacement	1	2021	4	2022
Qualification and Testing.	1	2021	4	2023
Unexploded Ordnance (UXO) Decision Point (DP)	1	2023	1	2023
Milestone C.	1	2024	1	2024

**Note**

C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks. C-DAEM Dual Purpose Improved Conventional Munition (DPICM) Replacement will destroy personnel to soft-skinned vehicles. C-DAEM Armor and DPICM Replacement are being pursued in parallel to support the Army's modernization priorities.



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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev				<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons			
<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>
FL4: Small Caliber Ammo for Next Gen Squad Weapons	-	17.432	26.483	28.372	-	28.372	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Small Caliber Ammo for Next Gen Squad Weapons project is a critical technology development in response to the Soldier Lethality Cross Functional Team (SL CFT) Initial Capability Document (ICD) for the ammunition required to support the rapid prototyping, development, and fielding of the Next Generation Squad Weapons (NGSW) under the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding. The objective is to develop and Full Materiel Release (FMR) the new ammunition in parallel with the NGSW rifle and automatic rifle. The NGSW ammunition is split into multiple ammunition variants, the General Purpose (GP), the Special Purpose (SP), the Reduced Range Ammunition (RRA), Tracer Ammunition, Blank Ammunition, the Close Combat Mission Capability Kit (CCMCK) training ammunition, Drill Dummy Inert (DDI) cartridge, and High Pressure Test (HPT) cartridge. Fiscal Year (FY) 2022 funding supports completing the GP rapid prototyping/development effort and starting the GP optimization effort. FY 2022 also supports continuing rapid prototyping for the SP projectile, manufacturing prototype ammunition required for safety testing, and conducting safety testing. FY 2022 supports continuing rapid prototyping efforts to develop RRA and RRA-Tracer for the NGSW, conducting a Critical Design Review (CDR), and manufacturing prototype ammunition required for safety testing. FY 2022 also supports continuing rapid prototyping effort to develop tracer ammunition for the NGSW, conducting a Preliminary Design Review (PDR), building and testing tracer ammunition prototypes, and maturing/refining down-selected tracer ammunition design. FY 2022 supports continuing rapid prototyping effort to mature the Blank ammunition and activities to accelerate the development/maturation of Blank ammunition designs. FY 2022 also supports the start of rapid prototyping effort to develop CCMCK training ammunition for the NGSW, building and evaluating competing CCMCK training ammunition designs/concepts, down-selecting to a CCMCK design, begin the process of maturing/refining selected design by performing engineering tests and implementing improvements based upon test results. FY 2022 also initiates the refined development of the DDI and HPT cartridges. This is a priority of the Secretary's Close Combat Lethality Task Force. Funding for this project aligns with the Army's priorities in support of the National Defense Strategy.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Rapid Prototyping GP	12.987	7.983	0.500
<b>Description:</b> Develop, demonstrate, and qualify new ammunition for the NGSW systems.			
<b>FY 2021 Plans:</b> Continuing rapid prototyping/development of the GP projectile, build prototypes and deliver prototypes to the weapon system contractors for integration into the weapon system development and conduct prototype testing and engineering testing. Evaluate prototype weapon systems from three contractors, conduct system level CDR, and down-select to one weapon system.			
<b>FY 2022 Plans:</b> Complete GP rapid prototyping/development effort and begin GP optimization efforts.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Effort transitions to production with Urgent Materiel Release (UMR) planned in FY 2022.				
<p><b>Title:</b> Rapid Prototyping SP</p> <p><b>Description:</b> Develop, demonstrate, and qualify new ammunition to defeat hard targets for the NGSW systems.</p> <p><b>FY 2021 Plans:</b> Continuing rapid prototyping for the Special Purpose (SP) projectile, conduct a Critical Design Review (CDR), and conduct prototype testing and engineering testing in preparation for cartridge system integration with weapons systems from three contractors.</p> <p><b>FY 2022 Plans:</b> Continuing rapid prototyping for the Special Purpose (SP) projectile, manufacture prototype ammunition required for safety testing, and conduct safety testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding request decreased due to planned FY 2022 activities.</p>		2.895	12.500	10.700
<p><b>Title:</b> Rapid Prototyping Reduced Range Ammunition (RRA) for NGSW</p> <p><b>Description:</b> Develop and qualify RRA for the NGSW that will satisfy the requirement to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. Two RRA variants will be developed under this effort - the NGSW RRA and the NGSW Reduced Range (RR) Tracer.</p> <p><b>FY 2021 Plans:</b> Begin rapid prototyping effort to develop RRA for the NGSW. Develop and mature RRA projectile concepts, award prototype development contract, investigate manufacturing processes, build and evaluate concept/prototype RRA ammunition. And, conduct a PDR in preparation for cartridge integration.</p> <p><b>FY 2022 Plans:</b> Continue rapid prototyping effort to develop RRA and RR Tracer ammunition for the NGSW, conduct a Critical Design Review (CDR), and manufacture prototype ammunition required for safety testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding request increased due to planned FY 2022 activities.</p>		0.050	3.500	8.500
<p><b>Title:</b> Rapid Prototyping Tracer Ammunition for NGSW</p> <p><b>Description:</b> Rapid prototyping effort to develop and field tracer ammunition for the NGSW systems by building and evaluating competing tracer ammunition designs/concepts then down-selecting to a final tracer design.</p>		-	1.500	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> Will begin rapid prototyping effort to develop tracer ammunition for the NGSW. Build and evaluate competing tracer ammunition designs/concepts, down-select to a tracer ammunition design, begin the process of maturing/refining selected design by performing engineering tests and implementing improvements based upon test results.</p> <p><b>FY 2022 Plans:</b> Continue rapid prototyping effort to develop tracer ammunition for the NGSW, conduct a Preliminary Design Review (PDR), build and test tracer ammunition prototypes, and mature/refine down-selected tracer ammunition design.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding request increased due to planned FY 2022 activities.</p>				
<p><b>Title:</b> Concept Evaluation of other NGSW Ammunition Variants</p> <p><b>Description:</b> Concept development/evaluation of follow-on variants / ammunition for the NGSW.</p> <p><b>FY 2021 Plans:</b> The follow-on variations of the ammunition for the various concepts will be developed and fabricated in support of engineering development, safety, prototype system testing. Complete a system Design Review and a user assessment planned in FY 2021. Follow-on NGSW ammunition types included: tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Follow-on effort requirements / ammunition variants were moved to individual lines within this form.</p>		1.500	1.000	-
<p><b>Title:</b> Rapid Prototyping Blank Ammo</p> <p><b>Description:</b> Rapid prototyping effort to develop and field blank ammunition for the NGSW systems by building and evaluating competing blank ammunition designs/concepts then down-selecting to a final blank design.</p> <p><b>FY 2022 Plans:</b> Continue rapid prototyping effort to mature the Blank ammunition and perform activities to accelerate the development/maturation of Blank ammunition designs.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Planned development efforts for the blank variant.</p>		-	-	2.000
<p><b>Title:</b> Rapid Prototyping CCMCK Training Ammo</p>		-	-	2.122

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Rapid prototyping effort to develop training ammunition for the NGSW systems by building and evaluating competing CCMCK training ammunition designs/concepts then down-selecting to a final design.</p> <p><b>FY 2022 Plans:</b> Start rapid prototyping effort to develop CCMCK training ammunition for the NGSW, building and evaluate CCMCK training ammunition designs/concepts, mature/refine selected design/designs by performing engineering tests and implementing improvements based upon test results.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Start of full CCMCK effort.</p>			
<p><b>Title:</b> Rapid Prototyping DDI and HPT Cartridges</p> <p><b>Description:</b> Rapid prototyping effort to develop and field DDI and HPT cartridges NGSW weapon systems.</p> <p><b>FY 2022 Plans:</b> Begin rapid prototyping activities to mature the DDI and HPT cartridges by building and evaluating competing DDI and HPT cartridge designs/concepts, maturing/refining selected design/designs by performing engineering tests and implementing improvements based upon test results.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Start of full DDI and HPT effort.</p>	-	-	0.550
<b>Accomplishments/Planned Programs Subtotals</b>	17.432	26.483	28.372

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

<b>Line Item</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>
• EC2: Adv Armor-Piercing (ADVAP) for Small Cal Ammo	8.572	-	-	-	-	-	-	-	-	-	-
• E06002: NEXT GENERATION COMBAT ROUND	-	11.988	65.056	-	65.056	-	-	-	-	-	-
• E06014: NEXT GENERATION REDUCED RANGE ROUND	-	-	4.807	-	4.807	-	-	-	-	-	-
• E06015: NEXT GENERATION SQUAD WEAPON SPECIAL PURPOSE ROUND	-	-	3.369	-	3.369	-	-	-	-	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	Total Cost
			Base	OCO	Total					Complete	
• E60011: NEXT GENERATION BLANK ROUND	-	-	3.562	-	3.562	-	-	-	-	-	-

**Remarks**

Budget Activity (BA) 4 (Program Element (PE) 0603639A Tank and Medium Caliber Ammunition Project EC2 RDTE/Adv Armor-Piercing (ADVAP) for Small Cal Ammo: This funding line starts the rapid development/rapid prototyping work on ammunition for the NGSW systems.

Procurement of Ammunition, Army E06002, E06014, E06015, and E60011: These funding lines supports the procurement of ammunition for the NGSW.

**D. Acquisition Strategy**

The NGSW ammunition program will utilize the Middle Tier of Acquisition (MTA) authority for rapid prototyping/rapid fielding to develop ammunition concepts/designs for the GP variant and the SP variant. The project will utilize Government developed projectile designs that will be delivered to development contractors as Government Furnished Material (GFM). The Government will select up to three contractors for the weapon system development and down-select to a single contractor in FY 2021, prior to production contract award; with a planned Urgent Materiel Release (UMR) in FY 2022 and FMR in FY 2024. Development effort for the Reduced Range and Tracer ammunition will follow a similar strategy beginning in FY 2021. Follow-on development efforts for additional NGSW ammunition variants including blank, CCMCK ammunition, DDI cartridge, and HPT cartridge will start in FY 2022.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FL4 / Small Caliber Ammo for Next Gen Squad Weapons							
Product Development (\$ in Millions)				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
Follow-on Ammo Prototypes/Concepts	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.200	Feb 2021	-		-		-	Continuing	Continuing	Continuing
Follow-on Ammo Prototypes/Concepts Contracts	Option/CPFF	Various : Various	-	1.500	May 2020	-		-		-		-	Continuing	Continuing	Continuing
Projectile and Ammo Development Contract General Purpose	Option/CPFF	OLIN Winchester Corporation (LCAAP) : Independence, Missouri	-	1.740	Sep 2020	2.400	Apr 2021	-		-		-	Continuing	Continuing	Continuing
Projectile and Ammo Development Contract General Purpose	Option/CPFF	Northrop Grumman Innovation Systems (NGIS) LCAAP : Independence, Missouri	-	7.189	Nov 2019	-		-		-		-	0.000	7.189	-
Projectile and Ammo Development Contract Special Purpose	Option/CPFF	OLIN Winchester Corporation (LCAAP) : Independence, Missouri	-	2.033	Sep 2020	5.400	May 2021	5.000	Dec 2021	-		5.000	Continuing	Continuing	Continuing
Ammo Development Support Special Purpose	Option/CPFF	Concurrent Technologies Corporation (CTC) : Johnstown, Pennsylvania	-	0.862	Sep 2020	-		-		-		-	0.000	0.862	-
Tracer Ammunition Prototype Contract	Option/CPFF	JAK Tool Engineering Solutions : Cranbury, New Jersey	-	-		0.750	May 2021	1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype Contract 1	Option/CPFF	JAK Tool Engineering Solutions : Cranbury, New Jersey	-	-		1.000	Feb 2021	2.200	Jan 2022	-		2.200	Continuing	Continuing	Continuing

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons
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<b>Product Development (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Reduced Range Ammunition Prototype Contract 2	Option/FFP	OLIN Winchester Corporation : Independence, Missouri	-	-		1.000	Apr 2021	2.200	Jan 2022	-		2.200	Continuing	Continuing	Continuing
General Purpose Optimization	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.500	Nov 2021	-		0.500	Continuing	Continuing	Continuing
Blank Ammo Development Contracts	TBD	To Be Determined : To Be Determined	-	-		-		1.000	Feb 2022	-		1.000	Continuing	Continuing	Continuing
CCMCK Training Ammo Development Contracts	TBD	To Be Determined : To Be Determined	-	-		-		1.000	Feb 2022	-		1.000	Continuing	Continuing	Continuing
DDI and HPT Development Contracts	TBD	To Be Determined : To Be Determined	-	-		-		0.400	Feb 2022	-		0.400	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	13.324		10.750		13.300		-		13.300	Continuing	Continuing	N/A

<b>Support (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Projectile Development and Support General Purpose	MIPR	Army Research Lab : Aberdeen, Maryland	-	1.153	Oct 2019	-		-		-		-	Continuing	Continuing	Continuing
Tracer Ammunition Development and Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.350	May 2021	1.000	Feb 2022	-		1.000	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype and Support	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	0.050	Jul 2020	1.000	Dec 2020	1.700	Nov 2021	-		1.700	Continuing	Continuing	Continuing
Projectile Development and Support General Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	2.080	Oct 2019	2.083	Feb 2021	-		-		-	0.000	4.163	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FL4 / Small Caliber Ammo for Next Gen Squad Weapons							
Support (\$ in Millions)				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
Projectile Development and Support Special Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		5.150	Feb 2021	2.500	Nov 2021	-		2.500	Continuing	Continuing	Continuing
Blank Ammo Development and Support CCDC AC	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.650	Nov 2021	-		0.650	Continuing	Continuing	Continuing
Blank Ammo Development and Support ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.300	Nov 2021	-		0.300	Continuing	Continuing	Continuing
CCMCK Training Development and Support CCDC AC	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.647	Nov 2021	-		0.647	Continuing	Continuing	Continuing
CCMCK Training Ammo Development and Support ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.200	Nov 2021	-		0.200	Continuing	Continuing	Continuing
DDI and HPT Development and Support CCDC AC	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		-		0.150	Nov 2021	-		0.150	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	3.283		8.583		7.147		-		7.147	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
U.S. Army Aberdeen Test Center (ATC) General Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.900	May 2021	-		-		-	Continuing	Continuing	Continuing
U.S. Army Aberdeen Test Center (ATC) Special Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		0.500	May 2021	-		-		-	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing General Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	0.800	Oct 2019	1.300	Nov 2020	-		-		-	0.000	2.100	-



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FL4 / Small Caliber Ammo for Next Gen Squad Weapons							
Test and Evaluation (\$ in Millions)				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
Army Research Lab (ARL) Testing Special Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		1.250	Nov 2020	1.100	Dec 2021	-		1.100	Continuing	Continuing	Continuing
Tracer Ammunition Engineering Tests	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.400	May 2021	0.300	Dec 2021	-		0.300	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype Testing	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		0.500	Feb 2021	1.000	Dec 2021	-		1.000	Continuing	Continuing	Continuing
Engineering Tests General Purpose	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	0.025	Oct 2019	-		-		-		-	0.000	0.025	-
Engineering Tests General Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		1.300	Feb 2021	-		-		-	0.000	1.300	-
Engineering Tests Special Purpose	MIPR	CCDC Armaments Center : Picatinny Arsenal, New Jersey	-	-		1.000	Feb 2021	1.000	Nov 2021	-		1.000	Continuing	Continuing	Continuing
Safety Tests Special Purpose	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		-		1.000	Jan 2022	-		1.000	Continuing	Continuing	Continuing
Independent Tests Special Purpose	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.100	Apr 2022	-		0.100	Continuing	Continuing	Continuing
Independent Tests Reduced Range	MIPR	Joint Munitions Command/ Ballistics Services Organization :	-	-		-		0.100	Apr 2022	-		0.100	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				FL4 / Small Caliber Ammo for Next Gen Squad Weapons							
Test and Evaluation (\$ in Millions)				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
		Independence, Missouri													
Army Research Lab (ARL) Testing Reduced Range	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		-		1.000	Dec 2021	-		1.000	Continuing	Continuing	Continuing
Independent Tests Tracer	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.100	Apr 2022	-		0.100	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing Tracer	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		-		1.000	Dec 2021	-		1.000	Continuing	Continuing	Continuing
Engineering Tests Tracer	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		-		0.900	Jan 2022	-		0.900	Continuing	Continuing	Continuing
Blank Ammo Engineering Tests	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.050	Apr 2022	-		0.050	Continuing	Continuing	Continuing
CCMCK Training Ammo Engineering Tests BSO	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		-		0.075	Apr 2022	-		0.075	Continuing	Continuing	Continuing
CCMCK Training Ammo Engineering Tests ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		-		0.200	Dec 2021	-		0.200	Continuing	Continuing	Continuing
<b>Subtotal</b>			-	0.825		7.150		7.925		-		7.925	Continuing	Continuing	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons

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
Rapid Prototyping Effort	[Blue bar spanning FY 2020 Q1 to FY 2023 Q4]																											
<i>Rapid Prototyping</i>	[Blue bar spanning FY 2020 Q1 to FY 2023 Q4]																											
Preliminary Design Review General Purpose (PDR-SP)	1																											
	PDR-SP																											
Critical Design Review General Purpose (CDR-GP)		2																										
		CDR-GP																										
Prototype Test 1			[Blue bar]																									
			PT1																									
Initial Product Review 3 (IPR 3) Special Purpose				3																								
				IPR 3 SP																								
Full Materiel Release (FMR) Transitions from BA04 EC2 to BA05 FL4							5																					
							FMR BA04 to BA05 Transition																					
Critical Design Review Special Purpose (CDR-SP)							6																					
							CDR-SP																					
Prototype Test 2								[Blue bar]																				
								PT2																				
Live Fire Test and Evaluation (LFT&E)								[Blue bar]																				
								LFT&E																				
Prototype & Manufacturing Integration (GP & SP)											[Blue bar]																	
											Mfg Integration GP & SP																	
Urgent Materiel Release General Purpose (UMR GP)															10													
															UMR GP													
Rapid Fielding GP																			[Blue bar]									
																			Rapid Fielding GP									
Production Qualification Test Special Purpose (PQT SP)																							[Blue bar]					
																							PQT SP					

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons

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
Urgent Materiel Release Special Purpose (UMR SP)													13 ▲ UMR SP															
Rapid Fielding SP													15 ▲ Rapid Fielding SP															
Full Materiel Release (FMR) (GP and SP)																	15 ▲ FMR (GP and SP)											
Initial Product Review (IPR) Reduced Range Ammo (RRA)																	4 ▲ IPR RRA											
Prototype Manufacturing Reduced Range Ammo (RRA)																												
Preliminary Design Review (PDR) Reduced Range Ammo (RRA)																									8 ▲ PDR-RRA			
Developmental Testing (DT) Reduced Range Ammo (RRA)													DT-RRA															
Critical Design Review Reduced Range Ammo (CDR-RRA)													11 ▲ CDR-RRA															
Product Qualification Testing Reduced Range Ammo (PQT-RRA)													PQT-RRA															
Urgent Materiel Release Reduced Range Ammo (UMR RRA)													14 ▲ UMR-RRA															
Initial Product Review (IPR) Tracer Ammo																												
Preliminary Design Review (PDR) Tracer Ammo																									7 ▲ IPR-Tracer Ammo			
Safety Testing Tracer Ammo													9 ▲ PDR-Tracer Ammo															
													Safety Testing-Tracer Ammo															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons

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	
Critical Design Review (CDR) Tracer Ammo													12 CDR-Tracer Ammo																
Prototype Testing Tracer Ammo													Prototype Testing-Tracer Ammo																
Rapid Fielding Tracer Ammo													Rapid Fielding-Tracer Ammo																
Materiel Release (MR) Tracer Ammo													16 MR-Tracer Ammo																
Rapid Prototyping Blank and CCMCK Training Ammo													Rapid Prototyping Blank and CCMCK Training Ammo																
Rapid Prototyping DDI and HPT Cartridges													Rapid Prototyping DDI and HPT Cartridges																

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> FL4 / <i>Small Caliber Ammo for Next Gen Squad Weapons</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Rapid Prototyping Effort	1	2019	3	2023
Initial Product Review 1 (IPR 1) Special Purpose	2	2019	2	2019
Preliminary Design Review General Purpose (PDR-GP)	3	2019	3	2019
Initial Product Review 2 (IPR 2) Special Purpose	4	2019	4	2019
Preliminary Design Review General Purpose (PDR-SP)	2	2020	2	2020
Critical Design Review General Purpose (CDR-GP)	3	2020	3	2020
Prototype Test 1	3	2020	4	2020
Initial Product Review 3 (IPR 3) Special Purpose	4	2020	4	2020
Full Materiel Release (FMR) Transitions from BA04 EC2 to BA05 FL4	2	2021	2	2021
Critical Design Review Special Purpose (CDR-SP)	2	2021	2	2021
Prototype Test 2	2	2021	3	2021
Live Fire Test and Evaluation (LFT&E)	2	2021	3	2021
Prototype & Manufacturing Integration (GP & SP)	4	2021	2	2023
Urgent Materiel Release General Purpose (UMR GP)	4	2022	4	2022
Rapid Fielding GP	4	2022	4	2027
Production Qualification Test Special Purpose (PQT SP)	1	2023	2	2023
Urgent Materiel Release Special Purpose (UMR SP)	3	2023	3	2023
Rapid Fielding SP	3	2023	4	2027
Full Materiel Release (FMR) (GP and SP)	2	2024	2	2024
Initial Product Review (IPR) Reduced Range Ammo (RRA)	4	2020	4	2020
Prototype Manufacturing Reduced Range Ammo (RRA)	1	2021	3	2022
Preliminary Design Review (PDR) Reduced Range Ammo (RRA)	4	2021	4	2021

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> FL4 / Small Caliber Ammo for Next Gen Squad Weapons
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Events	Start		End	
	Quarter	Year	Quarter	Year
Developmental Testing (DT) Reduced Range Ammo (RRA)	4	2022	1	2023
Critical Design Review Reduced Range Ammo (CDR-RRA)	2	2023	2	2023
Product Qualification Testing Reduced Range Ammo (PQT-RRA)	2	2023	3	2023
Urgent Materiel Release Reduced Range Ammo (UMR RRA)	4	2023	4	2023
Initial Product Review (IPR) Tracer Ammo	4	2021	4	2021
Preliminary Design Review (PDR) Tracer Ammo	2	2022	2	2022
Safety Testing Tracer Ammo	1	2023	2	2023
Critical Design Review (CDR) Tracer Ammo	2	2023	2	2023
Prototype Testing Tracer Ammo	3	2023	1	2024
Rapid Fielding Tracer Ammo	1	2024	4	2027
Materiel Release (MR) Tracer Ammo	4	2024	4	2024
Rapid Prototyping Blank and CCMCK Training Ammo	4	2020	4	2026
Rapid Prototyping DDI and HPT Cartridges	1	2022	4	2026

**Note**

- Special Purpose (SP)
- General Purpose (GP)
- Close Combat Mission Capability Kit (CCMCK)
- Drill Dummy Inert (DDI)
- High Pressure Test (HPT)



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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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
S36: Precision Guidance Kit	-	29.245	32.147	35.537	-	35.537	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

The Long Range-Precision Guidance Kit (LR-PGK) XM1171/XM1172 development effort will qualify state of the art technologies for a course correcting fuze that provides precision accuracy at extended ranges for current and future 155 millimeter (mm) High Explosive (HE) projectiles by eliminating a portion of the inherent errors associated with ballistic firing solutions, which effectively reduces the number of projectiles required to execute fire missions. LR-PGK will support projectile operation in Global Positioning System (GPS) degraded environments and compatibility with Army Modernization objectives under the Long Range Precision Fires Cross Functional Team's (LRPF CFT) new long range cannon, Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). The ERCA and its new long range projectiles require the LR-PGK to meet lethality requirements. Fiscal Year (FY) 2022 funding supports the fabrication of LR-PGK qualification test hardware and completion of guided flight testing with the XM1113ER projectile, XM655E1 Supercharge propellant and the ERCA weapon platform and accomplishes a system Critical Design Review (CDR) in support of Safety Release for First Unit Issued (FUI) for the ERCA Increased Range Operational Assessment.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Long Range-Precision Guidance Kit (LR-PGK) Development	29.245	32.147	35.537
<b>Description:</b> The LR-PGK development effort will qualify state of the art technologies for operation in GPS degraded environments as well as ensure compatibility with the Extended Range Cannon Artillery (ERCA) weapon and projectiles to meet Army Modernization objectives under the Long Range Precision Fires Cross Functional Team (LRPF CFT).			
<b>FY 2021 Plans:</b> EMD activities including prototype development, build and test activities as well as tactical guided flight testing in the threat environment.			
<b>FY 2022 Plans:</b> EMD activities including prototype testing, tactical guided flight testing in the threat environment, and fabrication of qualification test hardware.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 increase to support Army modernization requirements to achieve lethality at 70 kilometers (km) with precision accuracy by FY 2023. Additional Development/Operational testing costs are required to qualify the capability within the ERCA system of systems.			
<b>Accomplishments/Planned Programs Subtotals</b>	29.245	32.147	35.537

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	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
• E99251: LONG-RANGE PRECISION GUIDANCE KIT (LR-PGK)	-	-	24.677	-	24.677	-	-	-	-	-	-

**Remarks**  
A Procurement of Ammunition, Army (PAA) funding for Long Range-Precision Guidance Kit (LR-PGK), Standard Study Number (SSN) E99251, was established for this effort to transition to deliver Safety Release quantities for First Unit Issued (FUI) in support of the Extended Range Cannon Artillery (ERCA) Increased Range Operational Assessment as well as future Urgent Material Release (UMR) and Full Material Release (FMR) quantities.

**D. Acquisition Strategy**  
Long Range-Precision Guidance Kit (LR-PGK) XM1171/XM1172 development efforts are focused on addressing performance in Global Positioning System (GPS) degraded environments as well as ensuring compatibility with the Army's new long range 155mm cannon and projectiles, which are scheduled to be fielded in the same timeframe as LR-PGK. The initial contracting strategy included competitive DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) concept development efforts with multiple contractors in FY 2017, followed by a DOTC Risk Reduction concept maturation phase in FY 2018 through FY 2019. Down-select to one system contractor, BAE Systems, occurred in March 2020 for continuation through Engineering Manufacturing Development (EMD) and qualification with an FY 2022 award for Safety Release quantities for First Unit Issued (FUI) of Extended Range Cannon Artillery (ERCA) Increased Range Operational Assessment. Subsequent Urgent Materiel Release (UMR) deliveries will occur from 2023 through 2024. Qualification efforts will take place in 2023 through 2025 to support Milestone C. The Program will transition to a Federal Acquisition Regulation (FAR) based production contract after Milestone C for Low Rate Initial Production (LRIP) in FY 2025 and Full Rate Production (FRP) in FY 2026.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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<b>Management Services (\$ 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			
Program Management Office	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	13.995	0.022	Dec 2019	0.030	Oct 2020	0.100	Oct 2021	-		0.100	0.000	14.147	14.067
<b>Subtotal</b>			13.995	0.022		0.030		0.100		-		0.100	0.000	14.147	N/A

<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			
DOTC - LR-PGK Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology (DOTC) - BAE Systems : Minneapolis, MN	-	22.329	Mar 2020	19.955	Mar 2021	29.000	Nov 2021	-		29.000	0.000	71.284	33.046
DOTC - LR-PGK GPS System Maturation - L3 IEC	MIPR	DOD Ordnance Consortium (DOTC) - L3 - IEC : Various	13.667	3.745	Apr 2020	6.342	Dec 2020	-		-		-	0.000	23.754	10.551
<b>Subtotal</b>			13.667	26.074		26.297		29.000		-		29.000	0.000	95.038	N/A

**Remarks**  
FY 2022 increase to support Army modernization requirements to achieve lethality at 70km with precision by FY 2023.

<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			
Government Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	38.548	3.009	Nov 2019	4.470	Dec 2020	4.037	Oct 2021	-		4.037	0.000	50.064	41.412

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit
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<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			
<b>Subtotal</b>			38.548	3.009		4.470		4.037		-		4.037	0.000	50.064	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			
Development Testing for GPS Anti-Jam	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	2.178	0.140	Nov 2020	-		-		-		-	0.000	2.318	2.896
System Development Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	10.442	-		1.350	Mar 2021	2.400	Mar 2022	-		2.400	0.000	14.192	10.442
<b>Subtotal</b>			12.620	0.140		1.350		2.400		-		2.400	0.000	16.510	N/A

**Remarks**  
FY 2022 increase due to additional test activities to support Army modernization requirements to achieve lethality at 70km with precision by FY 2023.

	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>	78.830	29.245	32.147	35.537	-	35.537	0.000	175.759	N/A

**Remarks**  
Defense Ordnance Technology Consortium (DOTC)  
Long Range-Precision Guidance Kit (LR-PGK)  
Engineering and Manufacturing Development (EMD)  
Army Test and Evaluation Command (ATEC)

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit

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
Technology Maturation and Risk Reduction (TMRR) and EMD	[Blue bar spanning FY 2020 Q1 to FY 2026 Q4]																											
XM1113 / XM1128 / ERCA Requirements & Design Updates	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
Contract Award																												
Prototype Development & Testing																												
System Requirements / System Functional Reviews																												
Preliminary Design Review (PDR)																												
Critical Design Review (CDR) for Urgent Material Release (UMR)																												
UMR Safety/ Qualification Testing																												
Milestone B																												
CDR for Full Material Release (FMR)																												
Safety Release for ERCA First Unit Issued (FUI)																												
ERCA Systems of Systems (SoS) Operational Assessment (OA)																												
UMR																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> S36 / Precision Guidance Kit

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																	
FMR Qualification Testing																																													
Milestone C																																					9 MS-C								
Initial Operation Test and Evaluation (IOT&E)																																									10 IOT&E				
FMR																																									11 FMR				

**Note**  
 LR-PGK is pursuing a Safety Release to support ERCA IR System of Systems Operational Assessment. Follow-on Urgent Material Release (UMR) and Full Material Release (FMR) of LR-PGK will be qualified for future fielding. Milestone C and IOT&E scheduled for FY 2026 due to additional testing required for FMR qualification.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> S36 / <i>Precision Guidance Kit</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology Maturation and Risk Reduction (TMRR) and EMD	1	2019	1	2026
XM1113 / XM1128 / ERCA Requirements & Design Updates	1	2019	4	2020
Contract Award	2	2020	2	2020
Prototype Development & Testing	2	2020	3	2022
System Requirements / System Functional Reviews	3	2020	3	2020
Preliminary Design Review (PDR)	1	2022	1	2022
Critical Design Review (CDR) for Urgent Material Release (UMR)	4	2022	4	2022
UMR Safety/ Qualification Testing	3	2022	3	2023
Milestone B	4	2022	4	2022
CDR for Full Material Release (FMR)	4	2023	4	2023
Safety Release for ERCA First Unit Issued (FUI)	4	2023	4	2023
ERCA Systems of Systems (SoS) Operational Assessment (OA)	1	2024	4	2024
UMR	2	2024	2	2024
FMR Qualification Testing	1	2024	1	2025
Milestone C	2	2025	2	2025
Initial Operation Test and Evaluation (IOT&E)	2	2026	2	2026
FMR	3	2026	3	2026

**Note**

Engineering and Manufacturing Development (EMD)

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> XT2 / 40mm Door Breach
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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
XT2: 40mm Door Breach	-	-	2.912	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**

Project XT2, 40mm Door Breach has no Fiscal Year (FY) 2022 funding request and transitioned to procurement as a result of completing all EMD activities in FY 2021.

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

The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door to create an entry point into a building or other structure. This capability is critical during Urban Operations, while having stand-off ability to conduct ballistic breach at ranges up to 50 meters away, with a single-shot, and without pause between actual breach and entry of initial force. The 40mm DB cartridge will provide the small unit with the capability to conduct efficient breaching operations; allowing the Warfighter to create an entry point into a structure for an assault element to enter and begin clearing operations, one of the most difficult types of operations that Soldiers may face in an urban environment. The 40mm DB cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. In FY 2022 there is no funding request.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> 40mm LV DB, XM1167	-	2.912	-
<b>Description:</b> Engineering and Manufacturing Development (EMD) Activities.			
<b>FY 2021 Plans:</b> FY 2021 activities include DT&E efforts.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 decrease in funding is the result of completing all EMD activities.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	2.912	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

The DB cartridge development consists of characterization testing of multiple designs provided by industry which will be used to further inform a future down-select to a single design that will be taken through DT&E. Following DT&E, the program will proceed to Milestone C. After Milestone C, the program will enter into Low Rate Initial



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	<b>Project (Number/Name)</b> XT2 / <i>40mm Door Breach</i>
Production (LRIP) and conduct Final Hazard Classification (FHC) testing. The program will use the results of DT&E, LRIP and FHC testing to achieve Type Classification and Full Materiel Release in FY 2023.		

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> XT2 / 40mm Door Breach
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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			
Low Velocity (LV) Door Breach XM1167 Test Materials	C/CPFF	TBS : TBS	-	-		0.830	May 2021	-		-		-	0.000	0.830	-
<b>Subtotal</b>			-	-		0.830		-		-		-	0.000	0.830	N/A

<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			
LV Door Breach XM1167 - Combat Capabilities Development Command - Armaments Center (CCDC-AC)	MIPR	Picatinny Arsenal : NJ	-	-		0.497	May 2021	-		-		-	0.000	0.497	-
<b>Subtotal</b>			-	-		0.497		-		-		-	0.000	0.497	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			
LV Door Breach XM1167 Developmental Test & Evaluation	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		1.585	May 2021	-		-		-	0.000	1.585	-
<b>Subtotal</b>			-	-		1.585		-		-		-	0.000	1.585	N/A

			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>			-	-	2.912	-	-	-	0.000	2.912	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> XT2 / 40mm Door Breach

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
Low Velocity Door Breach XM1167 Test Hardware Builds																												
Low Velocity Door Breach XM1167 Developmental Test and Evaluation (DT&E)																												
Low Velocity Door Breach XM1167 Milestone C																												
Low Velocity Door Breach XM1167 Final Hazard Classification Testing (FHC)																												
Low Velocity Door Breach XM1167 Low Rate Initial Production Award (LRIP)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604802A / Weapons and Munitions - Eng Dev	<b>Project (Number/Name)</b> XT2 / 40mm Door Breach

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Low Velocity Door Breach XM1167 Test Hardware Builds	3	2021	4	2021
Low Velocity Door Breach XM1167 Developmental Test and Evaluation (DT&E)	4	2021	2	2022
Low Velocity Door Breach XM1167 Milestone C	2	2022	2	2022
Low Velocity Door Breach XM1167 Final Hazard Classification Testing (FHC)	2	2022	4	2022
Low Velocity Door Breach XM1167 Low Rate Initial Production Award (LRIP)	4	2022	4	2022

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

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev
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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	-	105.668	53.676	59.261	-	59.261	-	-	-	-	-	-
194: Engine Driven Gen Ed	-	8.050	8.916	17.217	-	17.217	-	-	-	-	-	-
EJ9: Maneuver Support Vessel (MSV)	-	25.933	9.591	4.333	-	4.333	-	-	-	-	-	-
FG4: Ultra-Lightweight Camouflage Net System (ULCANS)	-	11.219	8.000	-	-	-	-	-	-	-	-	-
H02: Tactical Bridging - Engineering Development	-	39.663	14.445	22.058	-	22.058	-	-	-	-	-	-
L39: Field Sustainment Support Ed	-	1.607	1.655	1.618	-	1.618	-	-	-	-	-	-
L41: Water And Petroleum Distribution - Ed	-	8.755	8.707	9.367	-	9.367	-	-	-	-	-	-
L43: ENGINEER SUPPORT EQUIPMENT - ED	-	1.191	-	-	-	-	-	-	-	-	-	-
L46: Maintenance Support Equipment	-	8.218	1.300	0.766	-	0.766	-	-	-	-	-	-
L47: Improved Environmental Control Units Ed	-	1.032	1.062	1.801	-	1.801	-	-	-	-	-	-
VR7: Combat Service Support Systems	-	-	-	2.101	-	2.101	-	-	-	-	-	-

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

This Program Element (PE) provides system development and demonstration for various projects. This PE includes the development of water craft, military tactical bridging, material handling equipment, construction equipment, engineer support equipment, soldier support equipment (to include shelter systems, environmental control, field service equipment, camouflage systems and aerial delivery equipment), water purification equipment, petroleum distribution equipment, and mobile electric power.

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

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev
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<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	107.826	49.694	52.808	-	52.808
Current President's Budget	105.668	53.676	59.261	-	59.261
Total Adjustments	-2.158	3.982	6.453	-	6.453
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-4.704			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.783	-			
• SBIR/STTR Transfer	-3.941	-1.814			
• Adjustments to Budget Years	-	-	6.453	-	6.453

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*

Congressional Add: *Mobile Camouflage System (MCS)*

Congressional Add Subtotals for Project: FG4

	<b>FY 2020</b>	<b>FY 2021</b>
	7.000	8.000
Congressional Add Subtotals for Project: FG4	7.000	8.000
	-	2.500
Congressional Add Subtotals for Project: H02	-	2.500
	5.000	-
Congressional Add Subtotals for Project: L46	5.000	-
Congressional Add Totals for all Projects	12.000	10.500

**Project:** H02: *Tactical Bridging - Engineering Development*

Congressional Add: *Program increase - health usage monitoring system*

Congressional Add Subtotals for Project: H02

**Project:** L46: *Maintenance Support Equipment*

Congressional Add: *Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM)*

Congressional Add Subtotals for Project: L46

**Change Summary Explanation**

The increase is due to:

Project 194 - Increase is due to the testing and evaluation of STEP Lightweight, development of STEP 3kW and PDISE Expansion FY22 prototype build contract award.

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>
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Project VR7 - RDT&E funding reinstated in FY22 to resume ASF-RWS program development.

Project EJ9 - Increase is the result of more substantial efforts consisting of Ship to Shore / Over the Shore Logistics Vessel (SSLV) market research along with affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and requirements development process.

Project L41 - Increase is for development and testing requirements for multiple Petroleum and Water System's programs.

**UNCLASSIFIED**

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> 194 / Engine Driven Gen Ed
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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
194: Engine Driven Gen Ed	-	8.050	8.916	17.217	-	17.217	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

This line supports the Army Network Modernization Strategy Line of Effort #4, Command Post. This line develops the capabilities to improve power generation and distribution across the Army Modernization priorities IAW the Army Futures Command Power and Battery Strategy. The main efforts are supporting modernizations within the Army Command Posts which in turn reduces Command Post sustainment requirements.

This project supports the Tactical Electric Power (TEP) programs (2kW-800kW Generators and Associated Equip) which is established to develop a modernized, standard family of Mobile Electric Power (MEP) systems to include MEP Generating Sources (MEPGS), and MEP Distribution Systems (MEPDS), MEP Storage Systems (MEPSS) and MEP Management Systems (MEPMS) for all Services throughout the Department of Defense IAW DoDI 4120.11. Building on the device/component evaluations conducted in PE 0603804A project G11, this project supports the system development and demonstration of a series of innovative mobile electric power systems that are essential to the development and eventual fielding of modernized MEPGS, MEPMS, MEPSS and MEPDS. This project also supports Army modernization priorities IAW the Power and Battery Strategy, specifically Combat Support/Combat Service Support (CS/CSS) demands in Network / Command, Control, Communications & Intelligence (C3I), Soldier Lethality, Air & Missile Defense and Long Range Precision Fires and reduces sustainment requirements.

PDISE provides reliable, modular design power distribution equipment that is critical to deploying power networks. PDISE Expansion will add power distribution > 60kW. The equipment developed will provide an interface for Large Power Distribution Systems (LPDS) and Prime Power Distribution Systems (PPDS) as well as future Onboard Vehicle Power systems, Hybrid and Storage power systems.

STEP is a modernization program for existing legacy small power generation systems, that will provide expeditionary, durable and reliable tactical electric power capabilities less than 5kW, to support operations in the austere environments of today's battlefield. The STEP program is a critical enabler to the Army modernization priorities under Army Futures Command Soldier Lethality Cross Function Team (CFT) and Network CFT. It will be power sources for Soldier borne sensors, lasers and optics.

FY 2022 funds will support prototyping and engineering, manufacturing and development efforts for the STEP Lightweight System, STEP 3kW and the PDISE Expansion power distribution solution.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Power Distribution Illumination Systems Electrical (PDISE) expansion	2.715	0.528	4.529
<b>Description:</b> Prepare PDISE - Prime effort by awarding the Prime Power Distribution System (PPDS) contract, developing Prime Power Connection Kit first article units and start developmental testing.			



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Provides safe power distribution from the point of generation to the point of need - Network/C3I, Air &amp; Missile Defense, Long Range Precision Fires, Command Post and Combat Support/Combat Service Support systems.</p> <p>PDISE components are man-portable, safe for all weather operation and allows the warfighter to get electricity where its needed, when its needed. It provides flexibility to field operations and can be quickly assembled/dissembled for rapid relocation.</p> <p><b>FY 2021 Plans:</b> LPDS MEPDS-800 risk mitigation.</p> <p><b>FY 2022 Plans:</b> FY22 PDISE Expansion Large and Prime prototype build contract award.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase for FY22 PDISE Expansion prototype build contract award.</p>				
<p><b>Title:</b> STEP</p> <p><b>Description:</b> The Small Tactical Electrical Power (STEP) is a modernization program for existing legacy 2kW and 3kW systems, that will provide small tactical electric power capabilities less than 5-Kilowatts (&lt;5kW), that is durable and reliable, in order to operate in the austere environments of today?s battlefield. The STEP program will consist of three distinct power generating and power storage capabilities. These systems will be approached along lines of efforts that associate with each system; STEP Lightweight (STEP-LW), STEP Hybrid Augmentation Systems (STEP HAS), and STEP 3kW. The STEP program is a critical enabler to the Army modernization priorities under Army Futures Command Soldier Lethality Cross Function Team (CFT) and Network CFT. It will be power sources for Soldier borne sensors, lasers and optics.</p> <p><b>FY 2021 Plans:</b> Small Tactical Electric Power (STEP) enters into MS B in 4Q FY 2021 beginning with the STEP 3kW system. The development contract for STEP Lightweight 2kW system was awarded in 1QFY21 and will continue through 3QFY22.</p> <p><b>FY 2022 Plans:</b> STEP 3kW EMD contract will begin 2QFY22, and the STEP-LW 2kW OTA will finish in 3QFY22.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase is due to the testing and evaluation of STEP Lightweight and development of the STEP 3kW.</p>		-	8.388	12.688
<b>Title:</b> Small Power Sources		5.335	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> 194 / Engine Driven Gen Ed

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Description:</b> Supports Tactical Electric Power in the 2kW-3kW range. Focuses on modernizing small power with hybrid and battery storage capabilities.			
<b>Accomplishments/Planned Programs Subtotals</b>	8.050	8.916	17.217

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• G11: Adv Elec Energy Con Ad	3.200	4.000	-	-	-	-	-	-	-	-	-
• MA9800: Generators And Associated Equip	115.912	101.239	47.606	-	47.606	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Small Tactical Electric Power (STEP) program is a modernization program that will provide a family of systems of improved mobile Tactical Electric Power (TEP) sources and will replace the legacy 2 kilowatt (kW) Military Tactical Generator (MTG) and the 3kW Tactical Quiet Generator (TQG). STEP models will be lightweight, modular, reliable, and more logistically supportable power sources than their predecessors for the Department of Defense's (DoD) 21st Century digitized forces.

The acquisition for STEP will incorporate Joint service requirements to reduce cost, maximize interoperability and increase performance over existing generator systems. STEP will implement 3 separate lines of effort. STEP Lightweight (STEP- LW) will conduct an effort to incentivize the industry and foster competition for small lightweight power generators. STEP-LW is currently in development through a prototype other transaction agreement. This effort includes prototyping, Soldier evaluations, testing and systems demonstration to deliver a design to meet all performance requirements and to provide the technical, logistics documentation to support STEP under the Army's two level maintenance concept. The STEP-LW generator sets are expected to enter the acquisition life-cycle at MS C in FY22. STEP 3kW system will enter development at MS B in FY21.

Power Distribution Illumination Systems Electrical (PDISE) Expansion is a modernization effort to improve power distribution for generators greater than 60kW. The Large Power Distribution Systems (LPDS) MEPDS-800 will interface with 100kW generators and improve Field Hospital operations. Prime Power Distribution Systems (PPDS) will interface with the Deployable Power Generation and Distribution System Power Unit.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> 194 / Engine Driven Gen Ed
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PDISE Prime	Various	PM E2S2 : Ft. Belvoir	1.275	-		-		-		-		-	Continuing	Continuing	Continuing
Small Power Sources	Various	PM E2S2 Ft. Belvoir : Ft. Belvoir	1.132	0.876		1.250		-		-		-	0.000	3.258	-
STEP	TBD	PM E2S2 Ft. Belvoir : PM E2S2 Ft. Belvoir	-	-		-		1.700		-		1.700	0.000	1.700	-
<b>Subtotal</b>			2.407	0.876		1.250		1.700		-		1.700	Continuing	Continuing	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PDISE Prime	C/CPFF	TBD : TBD	2.506	-		-		-		-		-	Continuing	Continuing	Continuing
AMMPS HYBRID	TBD	AMMPS HYBRID : FT. BELVOIR	1.743	1.607		-		-		-		-	0.000	3.350	-
Small Power Sources	TBD	STEP : TBD	-	2.719		4.338		-		-		-	0.000	7.057	-
STEP	TBD	PM E2S2 Ft. Belvoir : PM E2S2 Ft. Belvoir	-	-		-		10.086		-		10.086	0.000	10.086	-
PDISE LPDS/PPDS	TBD	Prototyping and engineering, manufacturing and development efforts : TBD	-	-		-		4.529	Jun 2022	-		4.529	0.000	4.529	-
<b>Subtotal</b>			4.249	4.326		4.338		14.615		-		14.615	Continuing	Continuing	N/A

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Small Power Sources	TBD	STEP : TBD	-	0.282		1.100		-		-		-	0.000	1.382	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> 194 / Engine Driven Gen Ed
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<b>Support (\$ 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>		<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>			
STEP	TBD	PM E2S2 Ft. Belvoir : PM E2S2 Ft. Belvoir	-	-		-		0.400		-		0.400	0.000	0.400	-	
<b>Subtotal</b>			-	0.282		1.100		0.400		-		0.400	0.000	1.782	N/A	

<b>Test and Evaluation (\$ 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>		<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>			
PDISE LPDS	MIPR	Army Test & Evaluation Ctr (ATEC) : APG, MD	1.310	1.108		0.528	Jan 2021	-		-		-	0.000	2.946	-	
Small Power Sources	TBD	STEP : TBD	-	1.458		1.700		-		-		-	0.000	3.158	-	
STEP	TBD	PM E2S2 Ft. Belvoir : PM E2S2 Ft. Belvoir	-	-		-		0.502		-		0.502	0.000	0.502	-	
<b>Subtotal</b>			1.310	2.566		2.228		0.502		-		0.502	0.000	6.606	N/A	

<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>	
<b>Project Cost Totals</b>	7.966	8.050	8.916	17.217	-	17.217	Continuing	Continuing	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> 194 / Engine Driven Gen Ed

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
STEP Lightweight 2kW OTA																												
STEP Lightweight MS C													▲ 4															
MS B Hybrid Augmentation System (HAS)																	▲ 5											
STEP HAS EMD																												
MS C- STEP HAS																									▲ 7			
MS B STEP 3kW									▲ 2																			
STEP 3kW EMD																												
STEP 3kW MS C																					▲ 6							
PDISE Expansion																												
PDISE Expansion Award													▲ 3															
PDISE Expansion First Article Build																												
PDISE Expansion First Article Test																												
PDISE Expansion Production 3Q FY24																					■							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 194 / <i>Engine Driven Gen Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
STEP Lightweight 2kW OTA	1	2021	3	2022
STEP Lightweight MS C	4	2022	4	2022
MS B Hybrid Augmentation System (HAS)	2	2024	2	2024
STEP HAS EMD	2	2024	2	2026
MS C- STEP HAS	3	2026	3	2026
MS B STEP 3kW	4	2021	4	2021
STEP 3kW EMD	2	2022	2	2025
STEP 3kW MS C	3	2025	3	2025
PDISE Expansion	2	2021	2	2021
PDISE Expansion Award	3	2022	3	2022
PDISE Expansion First Article Build	3	2022	2	2023
PDISE Expansion First Article Test	3	2023	2	2024
PDISE Expansion Production 3Q FY24	3	2024	3	2024

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel (MSV)</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>
EJ9: <i>Maneuver Support Vessel (MSV)</i>	-	25.933	9.591	4.333	-	4.333	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project line supports the family of Army Ship to Shore (S2S) connectors that support Dynamic Force Repositioning (DFR) by providing the Combatant, Multi-Domain Operations (MDO) and Joint All Domain Operations (JADO) Commanders with the ability to access multiple entry points via littorals and inland waterways (waterborne corridor) IOT sustain forces within an anti-access/area denial (A2/AD) bubble. The family of S2S connectors include the Maneuver Support Vessel (Light) and the Ship to Shore / Over the Shore Logistics Vessel (SSLV), which are the Army's first digital architecture vessels (with improved draft, speed, and payload) and critical modernization efforts in support of the Army's Watercraft Systems Transformation Strategy (AWSTS). S2S connectors will provide Surge, Precision and Dispersed Logistics to move and maneuver tailored forces, combat ready troops, platforms, equipment, and supply bulk fuel and water across the full spectrum of operations. S2S connectors mitigate A2/AD threats by providing access to shallow coastal waters, rivers, in narrow inland waterways in support of dispersed force elements in austere environments and where mature ports or road networks are unavailable.

The Maneuver Support Vessel (Light) - MSV(L) provides upgraded capabilities such as higher operational speed, reduced draft and increased payload to support expeditionary movement and maneuver of tailored forces and combat power to mitigate the Anti-Access/Area Denial (A2/AD) operational environment. Capable of delivering a combat configured Abrams, Stryker or Bradley Fighting Vehicles along with critical sustainment missions including delivery of food, water, fuel, and ammunition. MSV(L) is the first modernization program which will displace the Army's aging Landing Craft Mechanized-8 (LCM-8) class of vessels. The LCM-8 does not have the speed, functional draft (shallow water capability), interoperability, or maneuver capability to move today's Army Maneuver Platforms.

MSV(L) completes the Engineering and Manufacturing Development (EMD) phase in FY21 and delivers producing the single full scale prototype. The prototype will undergo contractor and government testing, which will inform the updated Joint Capabilities Integration Development System (JCIDS) requirements documentation at MS C. Following successful prototype testing, JCIDS requirements documentation approval and MS C approval, the Milestone Decision Authority (MDA) will authorize the start of the Production and Deployment (P&D) phase.

In order to meet the accelerated MSV(L) development, get this much needed capability into the hands of our soldiers sooner, and mitigate schedule risk, the Milestone Decision Authority (MDA) has authorized the execution of FY20/FY21 Other Procurement Army (OPA) funding (PE 8211R01001) ahead of milestone C for Logistics Development Products (LPD), statutory and regulatory documentation in support of milestone C, and Maritime Intermodal Training System (MITS) training development. Upon successful 1QFY21 MSV(L) program review, the MDA will authorize the Early Order Activities (EOA) IAW DoDI 5000.02, Section 5. (PROCEDURES), paragraph d.9. (g)2. [p.28] for the Original Equipment Manufacturer (OEM) to order low risk materials (engines, generators, and aluminum with associated labor costs for material handling). EOA minimizes the production gap between the prototype and LRIP vessels. EOA is planned to be exercised in 2QFY21 and MS C in 4QFY21 (LRIP start authorization).

**UNCLASSIFIED**

<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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> EJ9 / Maneuver Support Vessel (MSV)
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The Ship to Shore / Over the Shore Logistics Vessel (SSLV) is the second major modernization program in the AWSTS, which is a transformational capability that will provide a logistics capability to joint forces and intra-theater transport of time-sensitive, mission-critical personnel and materiel. While the SSLV is initially geared towards the INDOPACOM theater and emerging requirements, it will be an ocean going capability that can be moved to other theaters as the need arises..

The SSLV is a modernization program that will meet the joint formation's future strategic requirement for Surge, Precision and Dispersed Logistics to move and maneuver tailored forces, combat ready troops, platforms, equipment, and supply bulk fuel and water in support of MDO and JADO.

FY22 funds are used to conduct market research, affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Engineering and Manufacturing Development (EMD) Contract</p> <p><b>Description:</b> The EMD phase of the contract includes system engineering and analysis to support execution of the Preliminary Design Review (PDR), Critical Design Review (CDR), Contract Systems Integration Laboratory (CSIL) fabrication, model basin testing, production of full-scale prototype vessel and required testing. In addition, deliverables include development of Integrated Product Support (IPS) analysis and products, as well as, development of Technical Data Package (TDP).</p> <p><b>FY 2021 Plans:</b> Completion of the MSV(L) prototype vessel production and testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> MSV(L) EMD contract completed funding in FY21.</p>	20.027	6.842	-
<p><b>Title:</b> Government Test and Evaluation Support</p> <p><b>Description:</b> Government test support.</p> <p><b>FY 2021 Plans:</b> Testing evaluation activities to include contractor prototype extended acceptance trials and follow on government testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> MSV(L) has moved to Production.</p>	0.020	0.950	-
<p><b>Title:</b> Government Furnished Equipment (GFE)</p> <p><b>Description:</b> GFE for prototype vessel consists of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR).</p> <p><b>FY 2021 Plans:</b></p>	0.020	0.200	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel (MSV)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
GFE is required to support the full size prototype vessel and base station for testing. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> MSV(L) has moved to production, no GFE for SSLV.				
<b>Title:</b> Program Management / Systems Engineering <b>Description:</b> PM/Matrix Support includes PM and systems engineering oversight required to manage the program and provide contractor oversight. Salaries for support through the EMD phase of MSV(L) and start SSLV in FY 2021. <b>FY 2021 Plans:</b> Funds will cover matrix salaries for program management, logistics, and engineering support to include contract execution and contractor oversight for the MSV(L) and MSV (Next) programs. <b>FY 2022 Plans:</b> Funds will cover matrix salaries for Engineers supporting SSLV program. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding only for SSLV program. Funding decrease is due to MSV(L) Support is moving to OPA funding.		4.668	0.456	0.500
<b>Title:</b> Program Management Support Contract <b>Description:</b> Program Management and Contract Support for MSV(L) thru FY21 and SSLV program starting in FY21. <b>FY 2021 Plans:</b> Program Management Support to end the EMD phase of MSV(L) and start of concept design for MSV (Next) in Cyber Security, Contract Data Requirement List (CDRL) management, IMS support, C4ISR expertise, and Milestone C program documentation. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decrease is due to MSV(L) Contract Support transitioned to OPA funding.		0.934	1.143	-
<b>Title:</b> MSV(N) Affordability and Feasibility Studies <b>Description:</b> Conduct Affordability and Feasibility Studies for future watercraft modernization. <b>FY 2022 Plans:</b> Funding needed to conduct feasibility studies and conduct Affordability Analysis/Cost Analysis in support of AoA. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>		0.264	-	3.833

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel (MSV)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY22 funds are used to conduct market research, affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.			
<b>Accomplishments/Planned Programs Subtotals</b>	25.933	9.591	4.333

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

<b>Line Item</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>
• R03050: <i>Maneuver Support Vessel (Light) (MSV-L)</i>	14.185	76.576	76.660	-	76.660	-	-	-	-	-	-

**Remarks**

- Significant Accomplishments:
- CDR 2 Closeout 19 Dec 2019
  - Prototype Construction began 1 Oct 2019
  - Quality Assurance, Inspections, and Checks effectively conducted during build by ABS, DCMA, and Program Office
  - Successfully processed a TSARC request for a prototype crew
  - Conducted effective test planning for acceptance testing and early user assessment
  - Milestone C Documentation generated and submitted into staffing.

**D. Acquisition Strategy**

MSV(L) completes the Engineering and Manufacturing Development (EMD) phase in FY21 and delivers producing the single full scale prototype. The single full scale prototype will undergo contractor and government testing, which will inform the updated Joint Capabilities Integration Development System (JCIDS) requirements documentation at MS C. Following successful prototype testing, JCIDS requirements documentation approval and MS C approval, the Milestone Decision Authority (MDA) will authorize the start of the Production and Deployment (P&D) phase.

Ship to Shore / Over the Shore Logistics Vessel (SSLV): FY22 funds are used to conduct market research, affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> EJ9 / Maneuver Support Vessel (MSV)
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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			
Engineering and Manufacturing Development (EMD)	C/FFP	Vigor Works, LLC : Clackamas, OR	50.886	20.027	Nov 2019	6.842	Nov 2020	-		-		-	0.000	77.755	77.822
Government Furnished Equipment (GFE)	Reqn	Various : Various	2.297	0.020	Jan 2020	0.200	Jan 2021	-		-		-	0.000	2.517	-
Trade Studies and Business Analysis SSLV	TBD	Various : Various	-	0.264	Sep 2020	-		3.833	Nov 2021	-		3.833	Continuing	Continuing	-
<b>Subtotal</b>			53.183	20.311		7.042		3.833		-		3.833	Continuing	Continuing	N/A

**Remarks**  
MSV(L) Contract was awarded on 28 Sep 2017 to Vigor Works, LLC.

<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			
Salaries for Matrix Personnel Army Watercraft, GVSC, ILSC PSID and ACC-Wrn.	MIPR	Detroit Arsenal : Warren, MI 48397-5000	16.096	4.668	Nov 2019	0.456	Dec 2020	0.500	Dec 2021	-		0.500	0.000	21.720	-
Salaries / Travel for Program Management Support Contracts	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	3.747	0.934	Feb 2020	1.143	Dec 2020	-		-		-	0.000	5.824	-
<b>Subtotal</b>			19.843	5.602		1.599		0.500		-		0.500	0.000	27.544	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			
Test and Evaluation - Government	MIPR	ATEC: APG : APG, MD	1.026	0.020	Nov 2019	0.950	Nov 2020	-		-		-	0.000	1.996	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> EJ9 / Maneuver Support Vessel (MSV)
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Test and Evaluation (\$ in Millions)				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			
<b>Subtotal</b>			1.026	0.020		0.950		-		-		-	0.000	1.996	N/A

**Remarks**  
MSV(L) completes the Engineering and Manufacturing Development (EMD) phase in FY21 and delivers producing the single full scale prototype.

	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>	74.052	25.933	9.591	4.333	-	4.333	Continuing	Continuing	N/A

**Remarks**  
FY22 funds are used to conduct market research, affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel (MSV)</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
Salaries for Matrix Support	[Blue bar]																											
MSV(L) Contractor System Integration Laboratory (CSIL)	[Blue bar]																											
MSV(L) Knowledge Point 5 (KP5)	▲1																											
MSV(L) Prototype Build	[Blue bar]																											
MSV(L) Prototype Test and Evaluation (includes Subsystem t	[Blue bar]																											
MSV(L) Early Order Activities Authorized	[Grey bar]																											
MSV(L) Knowledge Point 6 (KP6)	[Grey bar]																											
MS(L) Milestone C	[Grey bar]																											
MSV(L) Low Rate Initial Production (LRIP) Authorized	[Grey bar]																											
SSLV Future Watercraft Modernization	[Blue bar]																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel (MSV)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Salaries for Matrix Support	4	2016	4	2026
MSV(L) Analysis of Alternatives (AoA) Final Report Complete	2	2015	2	2015
MSV(L) Capabilities Development Document (CDD) Approved	4	2015	4	2015
MSV(L) Configuration Steering Board (CSB) Held and Approved	1	2016	1	2016
MSV(L) Industry Day Held	1	2016	1	2016
MSV(L) Army Requirements Oversight Board (AROC) / CDD Update	4	2016	4	2016
MSV(L) CDD Update / Army Requirements Oversight Council (AROC)	4	2016	4	2016
MSV(L) RFP Posting	4	2016	4	2016
MSV(L) RFP Released	1	2017	1	2017
MSV(L) Milestone B	4	2017	4	2017
MSV(L) Contract Award - Knowledge Point 2	4	2017	4	2017
MSV(L) Knowledge Point 2 (KP2)	2	2018	2	2018
MSV(L) Preliminary Design Review (PDR)	3	2018	3	2018
MSV(L) Knowledge Point 3 (KP3)	4	2018	4	2018
MSV(L) Modeling and Simulation	4	2018	4	2018
MSV(L) Contractor System Integration Laboratory (CSIL)	4	2018	2	2022
MSV(L) Model Basin Testing	4	2018	1	2019
MSV(L) Knowledge Point 4 (KP4)	2	2019	2	2019
MSV(L) Critical Design Review (CDR)	2	2019	2	2019
MSV(L) Knowledge Point 5 (KP5)	1	2020	1	2020
MSV(L) Prototype Build	4	2019	3	2021
MSV(L) Prototype Test and Evaluation (includes Subsystem tests)	4	2019	4	2021

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> EJ9 / <i>Maneuver Support Vessel (MSV)</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
MSV(L) Early Order Activities Authorized	2	2021	2	2021
MSV(L) Knowledge Point 6 (KP6)	4	2021	4	2021
MS(L) Milestone C	1	2022	1	2022
MSV(L) Low Rate Initial Production (LRIP) Authorized	1	2022	1	2022
SSLV Future Watercraft Modernization	1	2021	4	2026

**Note**

FY22 funds are used to conduct market research, affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> FG4 / Ultra-Lightweight Camouflage Net System (ULCANS)
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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
FG4: <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>	-	11.219	8.000	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

ULCANS provides increased survivability against multi-spectral visual, infrared and radar threats, thermal signature suppression and significant thermal/solar reduction capability. ULCANS is capable of use in all types of weather and climatic conditions except in heavy snow and winds. ULCANS variants are integrated systems that are very lightweight, easily deployable, versatile, user friendly and tailored to the equipment meeting the requirements of operations for combat systems, command and control equipment, logistic support sites, tactical facilities, and fixed facilities. RDT&E funding for ULCANS Increment I program supports formal development for necessary technology/signature enhancements of three ULCANS Increment I variants (Woodland, Arctic, Desert/Urban) to replace current legacy ULCANS variants (Woodland and Desert).

Mobile Camouflage System (MCS) provides Full Spectrum Signature Management for Vehicles from ground, aerial, and satellite. MCS enables combat vehicle protection and survivability against current peer and near-peer threats; defeats enemy targeting and surveillance systems through multi-spectral concealment (UV, VIS, NIR, SWIR, Thermal, Radar); enables multi-domain operations in A2/AD environment and provides operational units layered protection and concealment against long-range precision fires, drones, ground, aerial, and satellite threats.

Funding supports modernization of current camouflage net systems by investigating technology insertions that decrease Soldier and ground combat vehicle detection from threat sensors. Funding also supports developing initial prototypes to enable refinement of operational requirements and early user feedback to maintain overmatch signature reduction against future threat sensors from peer competitors.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Ultra-lightweight Camouflage Net System (ULCANS)	4.219	-	-
<b>Description:</b> ULCANS is durable, robust, snag resistant state of the art camouflage system that provides increased survivability against multi-spectral visual, infrared and radar threats, thermal signature suppression and significant thermal/solar reduction capability. ULCANS utilizes a snag-free design and is capable of use in all types of weather and climatic conditions except in heavy snow and winds. ULCANS variants are integrated systems that are very lightweight, easily deployable, versatile, user friendly and tailored to the equipment meeting the requirements of operations for combat systems, command and control equipment, logistic support sites, tactical facilities, and fixed facilities. RDT&E funding for ULCANS Increment I program supports formal development for necessary technology/signature enhancements of three ULCANS Increment I variants (Woodland, Snow/Alpine, Desert/Urban) to replace current legacy ULCANS variants (Woodland and Desert).			



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Accomplishments/Planned Programs Subtotals</b>	4.219	-	-

	<b>FY 2020</b>	<b>FY 2021</b>
<b>Congressional Add:</b> Mobile Camouflage System (MCS)	7.000	8.000
<b>FY 2020 Accomplishments:</b> Prepared and solicited a Request for Prototype proposals under a DEVCOM-SC Other Transactional Authority (OTA) contract. Reviewed multiple white papers and down-selected to five full proposals for Gov't evaluation. Four proposals were selected for award with contract paperwork and approval in process to support final OTA contract awards in 2QFY21.		
<b>FY 2021 Plans:</b> Award OTA Phase I and II contracts and conduct testing and evaluation of the prototypes received to determine the best path forward for the MCS program. Utilize outcomes of OTA contract efforts to aid in requirements development to support EMD phase.		
<b>Congressional Adds Subtotals</b>	7.000	8.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy is to accelerate product development and testing to transition into production.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> FG4 / Ultra-Lightweight Camouflage Net System (ULCANS)
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
ULCANS	Various	PMFSS : Natick, MA	2.749	1.011		-		-		-		-	0.000	3.760	-
Mobile Camouflage System	TBD	PMFSS : Natick, MA	-	0.972		1.430		-		-		-	0.000	2.402	-
<b>Subtotal</b>			2.749	1.983		1.430		-		-		-	0.000	6.162	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
ULCANS Increment I Woodland Variant	C/FFP	PMFSS : Natick, MA	6.607	-		-		-		-		-	0.000	6.607	-
ULCANS Increment I Snow/Alpine Variant	C/FFP	PMFSS : Natick, MA	6.939	0.872		-		-		-		-	0.000	7.811	-
ULCANS Increment I Desert/Urban Variant	C/FFP	PMFSS : Natick, MA	-	1.812		-		-		-		-	0.000	1.812	-
Mobile Camouflage System (MCS)	TBD	PM FSS : Natick, MA	-	3.972		4.570		-		-		-	0.000	8.542	-
<b>Subtotal</b>			13.546	6.656		4.570		-		-		-	0.000	24.772	N/A

<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
ULCANS Increment I Woodland Variant	Various	Various : Various	2.925	-		-		-		-		-	0.000	2.925	-
ULCANS Increment I Snow/Alpine Variant	Various	Various : Various	2.963	-		-		-		-		-	0.000	2.963	-
ULCANS Increment I Desert/Urban Variant	Various	Various : Various	-	0.609		-		-		-		-	0.000	0.609	-
Mobile Camouflage System (MCS)	TBD	PM FSS : Natick, MA	-	1.971		2.000		-		-		-	0.000	3.971	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</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
EMD testing for Desert/Urban Variant	██████████																											
Complete documentation to support production decision for Desert/Urban Variant	██████████																											
Obtain production decision for Desert/Urban Variant					▲ 2																							
EMD testing for Snow/Alpine Variant					██████████																							
Complete documentation to support production decision for Snow/Alpine Variant	██████████				██████████																							
Obtain production decision for Snow/Alpine Variant					▲ 3																							
Prepare OTA prototype Phase 1 contracts for for Mobile Camouflage Net System	██████████																											
Award OTA prototype Phase 1 contracts for MCS					▲ 1																							
Prototype testing for MCS					██████████																							
Award OTA prototype Phase 2 contracts for MCS									▲ 4																			
Prepare documentation to support MS B Decision for MCS									██████████																			

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> FG4 / <i>Ultra-Lightweight Camouflage Net System (ULCANS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
EMD testing for Desert/Urban Variant	4	2019	2	2020
Complete documentation to support production decision for Desert/Urban Variant	1	2020	3	2020
Obtain production decision for Desert/Urban Variant	3	2021	3	2021
EMD testing for Snow/Alpine Variant	3	2020	2	2021
Complete documentation to support production decision for Snow/Alpine Variant	3	2020	3	2021
Obtain production decision for Snow/Alpine Variant	4	2021	4	2021
Prepare OTA prototype Phase 1 contracts for for Mobile Camouflage System (MCS)	2	2020	2	2021
Award OTA prototype Phase 1 contracts for MCS	2	2021	2	2021
Prototype testing for MCS	3	2021	1	2022
Award OTA prototype Phase 2 contracts for MCS	2	2022	2	2022
Prepare documentation to support MS B Decision for MCS	3	2022	4	2022

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</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>
H02: <i>Tactical Bridging - Engineering Development</i>	-	39.663	14.445	22.058	-	22.058	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project supports the engineering, prototyping, testing and manufacturing development of future force bridge systems and support equipment as well as improvements to existing systems within the Bridging Product Management portfolio.

Funding supports developmental and operational testing of the Line of Communication Bridge (LOCB), development, prototyping and testing of the Bridge Supplemental Set (BSS), operational testing of the Joint Assault Bridge (JAB), and funds multiple efforts to upgrade and modernize existing systems through the Family of Higher Military Load Classification Bridges (FoHMLC-B) program. Funding also supports the development of new systems and capabilities such as the Assault Float Bridging System and the Bridge Health Monitoring System (also known as Automated Bridge Condition Device (ABCD)). Funding also supports development, test, and evaluation of upgrades / modernization of the Joint Assault Bridge (JAB) and Assault Breacher Vehicle (ABV) M1A1 base chassis to the standard Army M1A2 SEPv3 configuration in order to improve maintainability and supportability, minimize impacts of obsolescence, and establish commonality with the current Abrams Main Battle Tank system.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Line of Communication Bridge (LOCB)	10.990	7.175	7.275
<p><b>Description:</b> Funding requested for development and testing of higher Military Load Classification (MLC) modular Line of Communication Bridging with the mobility to span fixed or float gaps spanning 50 to 800 meters wide. Actions include the purchase of test assets, bridge structural strength analysis, performance assessments, Production Qualification Testing (PQT) and Operational Testing (OT) of the Line of Communication Bridge (LOCB) system.</p> <p><b>FY 2021 Plans:</b> Funding supports LOCB modeling and simulation, performance assessments, bridge structural strength testing, transportability testing, durability testing and Production Qualification Testing (PQT).</p> <p><b>FY 2022 Plans:</b> Funding supports LOCB structural strength analysis, performance assessments, transportability testing, durability testing and continuation of PQT. Funding also supports temperature / corrosion testing and Operational Testing (OT).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2022 funding will increase slightly from FY 2021 due to the beginning Operational Testing (OT) as well as the continuation of transportability testing.				
<p><b>Title:</b> Bridge Supplemental Set (BSS)</p> <p><b>Description:</b> Funding to develop a multi-functional, consolidated engineering set consisting of an anchorage system, access/egress traction improvement matting, power generation, tools, and a float Bridge Protection Device (BPD). The BSS is targeted for use with multiple tactical bridging systems to include the Improved Ribbon Bridge (IRB). It will increase the capability of the Multi-Role Bridging Company (MRBC).</p> <p><b>FY 2021 Plans:</b> FY 2021 funding will support differential berm and uneven bank heights testing as well as BSS transportability testing.</p> <p><b>FY 2022 Plans:</b> Funding supports Production Qualification Testing (PQT) of the Bridge Protection Device (BPD) component of the BSS. The BPD is a stand-alone component of the BSS and is held in APS storage until required for real-time operational employment.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 decrease due to completion of testing of the major components of the BSS, with only the Bridge Protection Device remaining to test.</p>		2.750	0.810	0.400
<p><b>Title:</b> Family of Higher Military Load Classification Bridges (FoHMLC-B)</p> <p><b>Description:</b> Funding provided to develop the Family of Higher Military Load Classification Bridges (FoHMLC-B). The FoHMLC-B program will upgrade current bridging systems and develop future bridging systems to replace the Heavy Assault Scissor Bridge (HASB) carried on the Joint Assault Bridge (JAB) launcher, Dry Support Bridge (DSB), Improved Ribbon Bridge (IRB) and Assault Float Bridge sections/components to support the heavier weights of armored combat vehicles.</p> <p><b>FY 2021 Plans:</b> Funding supports the development of potential upgrades to increase the MLC rating of the HASB and the fabrication of an increased MLC HASB prototype.</p> <p><b>FY 2022 Plans:</b> Funding supports acquisition of DSB test assets and DSB test asset max weight test-to-fail analysis, Heavy Assault Scissor Bridge (HASB) up-weight prototype production and the design development of Assault Float bridging.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>		12.990	3.960	12.883

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2022 funding will increase over FY 2021 due to two separate prototyping efforts for up-weight HASB, DSB baseline testing and also the development of Assault Float bridging.				
<p><b>Title:</b> M1A2 Chassis Upgrade of Joint Assault Bridge (JAB) and Assault Breacher Vehicle (ABV)</p> <p><b>Description:</b> Funding requested for Joint Assault Bridge (JAB) / Assault Breacher Vehicle (ABV) M1A2 Chassis modernization development. Efforts will focus on enhanced reliability, maintainability and chassis commonality with the Abrams M1A2 SE Pv3 Main Battle Tank system.</p> <p><b>FY 2022 Plans:</b> Funding will support matrix program support, scope development and design engineering of the M1A2 chassis modernization effort for JAB and ABV systems.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2021 to FY 2022 increase due to initiation of the M1A2 SE Pv3 chassis modernization effort for the JAB and ABV systems in order to maintain consistency with the standard Army configuration of the M1A2 SE Pv3 Abrams Main Battle Tank chassis.</p>		-	-	1.500
<p><b>Title:</b> Joint Assault Bridge (JAB)</p> <p><b>Title:</b> Pending Reprogramming</p> <p><b>Description:</b> \$7.400 million directed cut by ASA(ALT) on 22 July 2020 for higher priority program requirements. Funds remain on the FY 2020 H02 project line pending reprogramming.</p>		5.533	-	-
		7.400	-	-
<b>Accomplishments/Planned Programs Subtotals</b>		39.663	11.945	22.058
		<b>FY 2020</b>	<b>FY 2021</b>	
<p><b>Congressional Add:</b> Program increase - health usage monitoring system</p> <p><b>FY 2021 Plans:</b> Funding supports a simple acquisition-competitive demonstration to each respondent of a market survey for a health usage monitoring system for bridging systems. Funding also supports research/engineering, software engineering/cyber support and program management support. The health usage monitoring system is currently being identified as the Automated Bridge Condition Device (ABCD).</p>		-	2.500	
<b>Congressional Adds Subtotals</b>		-	2.500	



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	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
• G06520: BRIDGE SUPPLEMENTAL SET	14.373	32.493	19.867	-	19.867	-	-	-	-	-	-
• G82404: LINE OF COMMUNICATION BRIDGE LOCB	64.705	60.945	9.625	-	9.625	-	-	-	-	-	-
• GZ3001: Joint Assault Bridge	151.123	-	110.773	-	110.773	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy is for Research, Development, Test & Evaluation efforts to support prototyping, testing and follow-on production efforts for future Bridging systems.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development
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<b>Management Services (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
System Engineering and Program Management	MIPR	Various : Various	-	2.431	Oct 2019	2.650	Oct 2020	2.700	Oct 2021	-		2.700	Continuing	Continuing	-
Pending Reprogramming	TBD	TBD : TBD	-	7.400	Jul 2020	-		-		-		-	0.000	7.400	-
<b>Subtotal</b>			-	9.831		2.650		2.700		-		2.700	Continuing	Continuing	N/A

<b>Product Development (\$ 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>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Line of Communication Bridge - Acrow MLC 80/110 130M Type 1 EMD Wet Gap	SS/FFP	Acrow Corporation of America : Parsippany, NJ	-	3.800	Mar 2021	-		-		-		-	0.000	3.800	-
Line of Communication Bridge - AGL MLC 80/110 130M Type 1 EMD Wet Gap	SS/FFP	Acrow Global Limited (AGL) (formerly Mabey Bridge Limited) : Lydney, UK	-	3.500	Mar 2021	-		-		-		-	0.000	3.500	-
Line of Communication Bridge - Acrow/AGL Type 2 Interface Kit Development / Prototypes	SS/FFP	Acrow Corporation of America / Acrow Global Limited (AGL) : Parsippany, NJ / Lydney, UK	-	-		0.725	Jun 2021	-		-		-	0.000	0.725	-
Family of High Military Load Class Bridges - IRB - ERDC Modeling, Simulation and Analysis	MIPR	US Army Corps of Engineers - Engineering Research and Development Center (ERDC) : Vicksburg, MS	-	7.000	Aug 2020	-		-		-		-	0.000	7.000	-
Family of High Military Load Class Bridges - HASB ECP Development / Product Improvements	MIPR	CCDC GVSC : SANGB, MI	-	2.300	Dec 2020	1.300	Dec 2021	-		-		-	0.000	3.600	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				H02 / Tactical Bridging - Engineering Development							
Product Development (\$ in Millions)				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
Family of High Military Load Class Bridges - HASB MLC120 Prototypes	MIPR	Anniston Army Depot (ANAD) : Anniston, AL	-	-		0.825	Mar 2021	0.825	Dec 2021	-		0.825	0.000	1.650	-
Family of High Military Load Class Bridges - DSB Test Assets	MIPR	GVSC CCDC - Bridge Test Lab : TBD	-	-		-		1.200	Dec 2021	-		1.200	0.000	1.200	-
Family of High Military Load Class Bridges - Assault Float Bridging - Design Development	MIPR	Various : Various	-	-		-		5.058	Oct 2021	-		5.058	0.000	5.058	-
Program increase - health usage monitoring system	MIPR	Various : Various	-	-		0.650	Apr 2021	-		-		-	0.000	0.650	-
Bridge Supplemental Set - Design Engineering / Prototype Development	MIPR	Tobyhanna Army Depot (TYAD) : Tobyhanna, PA	-	2.500	Dec 2020	0.210	Jan 2021	-		-		-	0.000	2.710	-
M1A2 JAB / ABV Chassis Upgrade - Design Development	MIPR	CCDC GVSC : Warren, MI	-	-		-		1.500	Oct 2021	-		1.500	27.000	28.500	Continuing
<b>Subtotal</b>			-	19.100		3.710		8.583		-		8.583	27.000	58.393	N/A
Support (\$ in Millions)				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
Bridge Test Lab	MIPR	CCDC GVSC - Bridge Test Lab : SANGB, MI	-	0.875	Oct 2019	0.875	Nov 2020	0.850	Nov 2021	-		0.850	Continuing	Continuing	-
Prototype/EMD Bridge Test Asset Transportation	TBD	TAC Code : TBD	-	0.256	Oct 2019	0.310	Jan 2021	0.325	Jan 2022	-		0.325	Continuing	Continuing	-
<b>Subtotal</b>			-	1.131		1.185		1.175		-		1.175	Continuing	Continuing	N/A

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


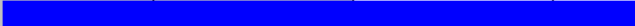








<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development
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<b>Test and Evaluation (\$ 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			
Line of Communication Bridge - PQT Transportability Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	1.247	Dec 2019	1.800	Feb 2021	1.950	Feb 2022	-		1.950	0.000	4.997	-
Line of Communication Bridge - PQT Durability Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	1.187	Mar 2020	1.650	Mar 2021	-		-		-	0.000	2.837	-
Line of Communication Bridge - Type I Structural Strength Testing (SST)	MIPR	CCDC Data Analysis Center (DAC) : Aberdeen Proving Ground, MD	-	-		0.750	Apr 2021	-		-		-	0.000	0.750	-
Line of Communication Bridge - Operational Testing (OT)	MIPR	Operational Test Command (OTC) : Fort Hood, TX	-	-		0.250	Sep 2021	4.000	Mar 2022	-		4.000	0.000	4.250	-
Family of High Military Load Class Bridges - HASB Max Weight - Test to Fail	MIPR	CCDC GVSC - Bridge Test Lab : SANGB, MI	-	1.384	Jul 2020	-		-		-		-	0.000	1.384	-
Family of High Military Load Class Bridges - DSB - Baseline Testing - Max Weight - Test to Fail	MIPR	CCDC GVSC - Bridge Test Lab : SANGB, MI	-	-		-		1.650	Jan 2022	-		1.650	0.000	1.650	-
Family of High Military Load Class Bridges - HASB Upweight Prototype Testing	MIPR	CCDC GVSC - Bridge Test Lab : SANGB, MI	-	-		-		1.600	Jul 2022	-		1.600	0.000	1.600	-
Bridge Supplemental Set - Test & Evaluation	MIPR	US Army Corps of Engineers - Engineering Research and Development Center (ERDC) : Vicksburg, MS	-	0.250	Jan 2021	0.600	May 2021	0.400	Dec 2021	-		0.400	0.000	1.250	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development	

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
<b>Line Of Communication Bridge (LOCB)</b>																												
LOCB Milestone "C"					 LOCB - MS"C"																							
LOCB Transportability Testing																												
LOCB Durability Testing																												
LOCB Operational Testing																												
LOCB Structural Strength Testing																												
<b>Bridge Supplemental Set (BSS)</b>																												
BSS Prototyping																												
BSS Milestone "C"					 BSS - MS"C"																							
BSS Transportability Testing																												
BSS Bridge Protection Device (BPD) Testing																												
<b>Family of High Military Load Class - Bridging (FoHMLC-B)</b>																												
FoHMLC HASB Max MLC Testing																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev
	<b>Project (Number/Name)</b> H02 / Tactical Bridging - Engineering Development

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								
FoHMLC Abbreviated Capabilities Decision Document					2 FoHMLC A-CDD																															
FoHMLC HASB ECP Design and Prototyping																																				
FoHMLC HASB Developmental Testing																																				
FoHMLC Assault Float Development Engineering																																				
FoHMLC IRB OTA Award																																				
FoHMLC IRB Design and Prototyping																																				
FoHMLC IRB Prototype Developmental Testing																																				
FoHMLC DSB OTA Award																																				
FoHMLC DSB Design and Prototyping																																				
FoHMLC DSB Prototype Developmental Testing																																				
FoHMLC IRB Production Qualification Testing / Operational Testing																																				
<b>M1A2 Chassis Upgrade - JAB / ABV</b>																																				
M1A2 Chassis Upgrade Scope / Design Development																																				

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</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
M1A2 Chassis Upgrade Development / Design Engineering													M1A2 Chassis Upgrade Dev. Eng.															
M1A2 Chassis Upgrade Source Selection													M1A2 SSEB															
M1A2 Chassis Integration Prototyping													M1A2 Chassis Prototype															
M1A2 Chassis Prototype Testing													M1A2 Prototype Testing															
<b>Program increase - health usage monitoring system</b>													ABCD - Design / Development / Demonstration															
Automated Bridge Condition Device (ABCD)																												



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Line Of Communication Bridge (LOCB)	2	2012	4	2021
LOCB Milestone "C"	4	2021	4	2021
LOCB Transportability Testing	1	2020	2	2023
LOCB Durability Testing	2	2020	4	2022
LOCB Operational Testing	2	2022	2	2023
LOCB Structural Strength Testing	3	2021	1	2022
Bridge Supplemental Set (BSS)	2	2019	2	2026
BSS Prototyping	4	2020	4	2021
BSS Milestone "C"	2	2021	2	2021
BSS Transportability Testing	3	2021	4	2021
BSS Bridge Protection Device (BPD) Testing	1	2022	2	2022
Family of High Military Load Class - Bridging (FoHMLC-B)	1	2018	2	2022
FoHMLC HASB Max MLC Testing	1	2020	3	2020
FoHMLC Abbreviated Capabilities Decision Document	2	2021	2	2021
FoHMLC HASB ECP Design and Prototyping	1	2021	3	2022
FoHMLC HASB Developmental Testing	4	2022	4	2023
FoHMLC Assault Float Development Engineering	1	2022	4	2023
FoHMLC IRB OTA Award	3	2023	3	2023
FoHMLC IRB Design and Prototyping	3	2023	1	2025
FoHMLC IRB Prototype Developmental Testing	2	2025	2	2026
FoHMLC DSB OTA Award	3	2024	3	2024
FoHMLC DSB Design and Prototyping	3	2024	1	2026

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> H02 / <i>Tactical Bridging - Engineering Development</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
FoHMLC DSB Prototype Developmental Testing	2	2026	2	2027
FoHMLC IRB Production Qualification Testing / Operational Testing	3	2026	3	2027
M1A2 Chassis Upgrade - JAB / ABV	1	2022	1	2026
M1A2 Chassis Upgrade Scope / Design Development	1	2022	1	2023
M1A2 Chassis Upgrade Development / Design Engineering	1	2023	1	2024
M1A2 Chassis Upgrade Source Selection	1	2024	2	2024
M1A2 Chassis Integration Prototyping	3	2024	3	2025
M1A2 Chassis Prototype Testing	3	2025	1	2027
Program increase - health usage monitoring system	3	2021	4	2022
Automated Bridge Condition Device (ABCD)	2	2021	4	2022

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> L39 / Field Sustainment Support Ed			
<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>
L39: Field Sustainment Support Ed	-	1.607	1.655	1.618	-	1.618	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This project supports the Engineering and Manufacturing Development (EMD) of critical capabilities for cargo aerial delivery for identified theater distribution and services capability gaps, improve unit sustainability, and increase combat effectiveness. Project supports the demonstration of engineering development models and Type Classification of cargo parachutes, airdrop containers, sling load equipment, and other aerial delivery equipment to improve safety, effectiveness, and efficiency of airborne operations. This project develops critical enablers that support the Army in executing future movement and maneuver operations and distributed sustainment support and the Army's Modular Force Capabilities by maintaining readiness through fielding and integrating new equipment. This project also ensures Army Expeditionary Forces are capable of rapid deployment by providing aerial delivery initiatives and reduces sustainment requirements, related Combat Support/ Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support.

Funding supports modernization of current cargo aerial delivery systems by investigating technology insertions that increase accuracy, collision avoidance, in flight communications, and reliability. Funding also supports developing initial prototypes to enable refinement of operational requirements and early user feedback to support future sustainment and operational movement concepts.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Rapid Rigging and DeRigging Airdrop System (RRDAS)	1.607	1.655	1.618
<b>Description:</b> Reduces rigging times while also providing the capability to rapidly de-rig loads on the drop zone. This will reduce the lead time to prepare Low Velocity Airdrop Load (LVADS) loads while also increasing the survivability of receiving ground forces by ensuring the airdrop loads (to include weapon systems, prime movers, trailers, etc.) are quickly de-rigged and made operational.			
<b>FY 2021 Plans:</b> Conduct down selection, limited user evaluation and initiate Developmental Testing.(DT).			
<b>FY 2022 Plans:</b> Complete Development Testing, initiate Operational Testing and continue development of logistics requirements and documentation to support Milestone C Production and Type Classification Standard decisions for RRDAS-Light in FY2023.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Increased funds to complete MS C production.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.607	1.655	1.618

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MA7806: <i>Precision Airdrop</i>	2.040	2.040	2.081	-	2.081	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy is to accelerate product development and testing to transition into production.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				L39 / Field Sustainment Support Ed							
Management Services (\$ in Millions)				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
Project Management Support	Various	PM FSS : Natick, MA	5.854	0.325		0.337		0.465		-		0.465	0.000	6.981	Continuing
<b>Subtotal</b>			5.854	0.325		0.337		0.465		-		0.465	0.000	6.981	N/A
Product Development (\$ in Millions)				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
ALVADS-L&H	Various	Various : Various	17.152	-		-		-		-		-	0.000	17.152	Continuing
EHLSCDS	Various	Various : Various	0.715	-		-		-		-		-	0.000	0.715	-
JPADS	Various	Various : Various	1.853	-		-		-		-		-	0.000	1.853	-
RRDAS	Various	Various : Various	0.948	0.832		0.418		0.453		-		0.453	0.000	2.651	-
<b>Subtotal</b>			20.668	0.832		0.418		0.453		-		0.453	0.000	22.371	N/A
Support (\$ in Millions)				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
EHLSCDS	Various	Various : Various	0.424	-		-		-		-		-	0.000	0.424	-
ALVADS	Various	Various : Various	0.050	-		-		-		-		-	0.000	0.050	-
JPADS	Various	Various : Various	0.200	-		-		-		-		-	0.000	0.200	-
<b>Subtotal</b>			0.674	-		-		-		-		-	0.000	0.674	N/A
Test and Evaluation (\$ in Millions)				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
EHLSCDS	Various	Yuma Proving Ground (YPG), AZ, AEC : AZ	11.040	-		-		-		-		-	0.000	11.040	Continuing



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L39 / Field Sustainment Support Ed

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		
Complete Milestone B for RRDAS-L					▲ 1																									
Develop and fabricate RRDAS-L demonstration validation proto																														
Conduct DV testing for Rapid Rigging De Rigging Airdrop System (RRDAS)-L																														
Conduct DT/OT for RRDAS-L																														
Complete Milestone TC-STD for RRDAS-L													▲ 2																	
Complete MS B for RRDAS-Heavy																▲ 3														
Develop and Fabricate RRDAS - Heavy Prototypes																														
Conduct DT and OT for RRDAS-Heavy																														
Complete MS C/TC STD for RRDAS-Heavy																											▲ 4			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L39 / <i>Field Sustainment Support Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Complete Milestone B for RRDAS-L	2	2021	2	2021
Develop and fabricate RRDAS-L demonstration validation prototypes	3	2019	4	2020
Conduct DV testing for Rapid Rigging De Rigging Airdrop System (RRDAS)-L	2	2021	4	2021
Conduct DT/OT for RRDAS-L	1	2022	1	2023
Complete Milestone TC-STD for RRDAS-L	4	2023	4	2023
Complete MS B for RRDAS-Heavy	1	2024	1	2024
Develop and Fabricate RRDAS - Heavy Prototypes	1	2024	2	2024
Conduct DT and OT for RRDAS-Heavy	3	2024	3	2025
Complete MS C/TC STD for RRDAS-Heavy	1	2026	1	2026



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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed			
<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>
L41: Water And Petroleum Distribution - Ed	-	8.755	8.707	9.367	-	9.367	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Modular Fuel System (MFS) Tank Rack Module (TRM) - M107 Pump Modification Kit Development is a new start for FY22

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

This project supports engineering and manufacturing development efforts as well as the Production Qualification Testing (PQT) and First Article Testing (FAT) efforts to provide all services with ample supply of clean fuel and water, supporting all types of missions. The Army has the mission to supply fuel for all land-based forces, including the Marines and the Air Force, and for supplying bulk drinking water to Soldiers. These programs enable the Army to improve maneuver sustainment operations to meet the demands of Army units and the Future Force. The mission includes receiving and transferring petroleum from trucks, ships, pipelines, and permanent and temporary storage facilities; moving petroleum from storage to and within corps and division areas; fuel quality surveillance testing; and dispensing in support of tactical operations, including rapid refueling of aircraft. This project also supports development and analysis of technologies designed to increase survivability of petroleum and water systems that may operate or be transported in hostile environments. The mission covers water purification and waste water treatment, reutilization, storage, distribution, alternative water source acquisition, disposal, and quality control. These research and development missions support the development and enhancement of rapidly deployed Petroleum and Water equipment, which enables the Army to achieve its vision by providing a highly mobile and self-sustaining systems in hostile joint operations areas. Programs funded on this Project includes: Tactical Fuel Distribution System (TFDS), Bulk Fuel Distribution System (BFDS), Petroleum Expeditionary Analysis Kit (PEAK), Water Bison and Water Bison Light, Water Storage and Distribution System (WSDS) , 3K Tactical Water Purification System (TWPS), Early Entry Fluid Distribution System (E2FDS) and Pipeline Trace Tool - Software Development, Modular Tactical Retail Refueling System (MTRRS), and Load Handling System (LHS) - Compatible Water Tank-rack System (HIPPO), Chemical Biological Radiological Nuclear (CBRN) Water Hauler (Camel).

This Project provides for the modernization of current Petroleum and Water System fleets by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Victory Architecture, autonomous operations and other emerging technologies. Funding also supports developing and testing initial prototypes, and production representative articles to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts. Funding supports non-traditional and middle tier acquisitions to include Other Transaction Authority (OTA) and 804.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Water Bison / Bison Lite	-	1.991	2.053
<b>Description:</b> The Unit Water Trailer (Water Bison) is a replacement for the 400 gallon Water Buffalo. A second variant, the Water Bison Lite, is also required. The Water Bison consists of a baffled, 500 gallon capacity tank and the Water Bison Lite consists of a baffled, 250 gallon capacity tank. They provide the modular force an efficient method of transporting a full day of supply (DOS)			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>of bulk potable water. Both systems include freeze protection that are mounted on a trailer and include all hoses and fittings necessary to dispense water by means of gravity flow. The Water Bison and Water Bison Lite will be used by units at all echelons. The Family of Medium Tactical Vehicles (FMTV) shall be capable of towing this system.</p> <p><b>FY 2021 Plans:</b> Water Bison - Award Other Transaction Authority (OTA) prototype contract</p> <p><b>FY 2022 Plans:</b> Water Bison - Prototype Testing at Yuma Proving Grounds, AZ Bison Lite - System design and engineering development for prototyping</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increases in FY22 to complete Water Bison prototype testing and begins second variant Bison Lite prototype design engineering.</p>			
<p><b>Title:</b> Early Entry Fluid Distribution System (E2FDS)</p> <p><b>Description:</b> The Early Entry Fluid Distribution System (E2FDS) is a new system that enhances the Inland Petroleum Distribution System (IPDS) pipeline and rapidly establishes new or extends existing pipeline traces. It is a high throughput flexible conduit system for the transport of bulk petroleum or water across the battlefield. It is rapidly-emplaced and capable of a throughput of 850,000 gallons of fuel or 650,000 gallons of raw non-potable water, per a 20 hour operational day through a trace up to 50 miles long. The E2FDS requires little to no engineer support to emplace the conduit or pump stations. Pump stations are fully automated and centrally controlled.</p> <p><b>FY 2021 Plans:</b> Limited User Test (LUT), Material Release documentation and Full Rate Production (FRP).</p> <p><b>FY 2022 Plans:</b> Completion of Limited User Test (LUT), Material Release and final matrix testing support personnel costs before transitioning to Full Rate Production (FRP)</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreases for E2FDS as final testing is completed and program transitions to transitioning to Full Rate Production (FRP).</p>	3.752	0.557	0.150
<p><b>Title:</b> Modular Tactical Retail Refueling System (MTRRS)</p> <p><b>Description:</b> The Mobile Tactical Retail Refueling System (MTRRS) will serve as a bulk fuel carrier and retail dispenser for military vehicles and ground support equipment, providing fuel in all operational environments. The MTRRS allows for different configurations or transport platforms including Medium Tactical Vehicle (MTV) cargo trucks, MTV Trailers, and the Palletized</p>	0.472	1.832	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Load System (PLS) flat-racks. MTRRS ground operation is possible by using Material Handling Equipment (MHE) to remove the MTRRS from the transport platform. The MTRRS provides fuel storage (900 Gallons (T), 1200 Gallons (O)), filtration, and unit-level retail capabilities with the ability to refuel ground vehicles, ground equipment, and fuel containers. MTRRS includes an electric pump that will provide a minimum flow rate of 17 Gallons per Minute (GPM) of filtered fuel. The prime mover or a separate generator provides power using an included North Atlantic Treaty Organization (NATO) slave cable.</p> <p><b>FY 2021 Plans:</b> Conduct Production Qualification Testing (PQT) , Helicopter Sling Load (HSL) Testing, Technical Manual (TM) and provisioning development. Program transitions to Full Rate Production (FRP).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in FY22 funding due to program transitioning to Full Rate Production (FRP).</p>			
<p><b>Title:</b> Petroleum Expeditionary Analysis Kit (PEAK)</p> <p><b>Description:</b> The Petroleum Expeditionary Analysis Kit (PEAK) replaces Aviation Fuels Contamination Test Kit (AFCTK) and provides fuel quality surveillance within all Brigade Combat Teams and Support Brigades. It is a stand-alone system that will rapidly verify petroleum products' suitability for use at point of consumption. The PEAK will evaluate all kerosene-based and diesel fuels used in ground systems and aircraft. It will provide the field with the capability to determine fuel type, grade, and additives.</p> <p><b>FY 2021 Plans:</b> Award of PEAK Other Transaction Authority (OTA) contract and beginning of prototype Run-off down select testing.</p> <p><b>FY 2022 Plans:</b> Complete Prototype Testing and conducting Production Qualification Testing, Customer Testing and Logistics User Test (LUT)</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreases in FY22 due to completion of prototype testing and the beginning of LRIP production.</p>	0.150	1.966	0.550
<p><b>Title:</b> Tactical Fuel Distribution System (TFDS)</p> <p><b>Description:</b> The Tactical Fuel Distribution System (TFDS) provides theater bulk petroleum distribution to maximize throughput in order to support early entry, buildup, and onward movement of forces. It replaces the M967 and M969 tanker trailers, which are nearing the end of its useful life. The TFDS consists of a 5,000 gallon armor kit compatible line haul tanker trailer, pulled primarily by the M1088 tractor. It shall be capable of retail fuel distribution and able to travel on unimproved roads and provides support from the Theater Army to Echelons Above Brigade (EAB).</p> <p><b>FY 2021 Plans:</b></p>	-	1.575	1.536

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Award of TFDS Other Transactional Authority (OTA) contract for prototypes				
<b>FY 2022 Plans:</b> Start of Prototype Run-off testing for contractor down select and Ballistics Armor study/testing.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase in FY22 funding due to prototype testing and ballistics study.				
<b>Title:</b> Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)		2.764	0.300	1.393
<b>Description:</b> Load Handling System (LHS) - Compatible Water Tank Rack System (HIPPO) replaces the Forward Area Water Point Supply system (FAWPSS) and Semi-Trailer Mounted Fabric Tank (SMFT). It provides capability to receive, store, transport, and distribute bulk and unit retail water to the warfighter. The HIPPO consists of a 2,000 gallon potable water tank in a 20' ISO frame with integrated pump, engine, alternator, hose reel, freeze prevention, and fill stand. The HIPPO is critical for sustaining the soldier and accomplishing combat service support missions at all echelons. Legacy water distribution systems do not provide the mobility required to achieve unit distribution goals for the current and objective force.				
<b>FY 2021 Plans:</b> Funds are required to conduct testing on three prototypes and Request for Production Proposal (RFP) and evaluation.				
<b>FY 2022 Plans:</b> Complete Production qualification Testing (PQT) and Operational Test.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to completing testing and moving into production qualification testing (PQT).				
<b>Title:</b> Bulk Fuel Distribution System (BFDS)		1.315	0.356	1.342
<b>Description:</b> The Bulk Fuel Distribution System (BFDS) provides theater bulk petroleum distribution to maximize throughput to support early entry, buildup, and onward movement of forces. The BFDS consists of a 7,500 gallon line haul tanker trailer, pulled primarily by the M915A3 or later version tractor. The BFDS provides bulk distribution between large fuel storage areas and will include a automated level gauge sensor for mission command reporting and providing asset and in-transit visibility. The BFDS is not capable of off-road or retail operations.				
<b>FY 2021 Plans:</b> Developmental Testing (DT).				
<b>FY 2022 Plans:</b>				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Complete Production Qualification Testing, Complete Limited User Testing				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase in FY22 funding due to testing costs.				
<b>Title:</b> Water and Storage System (WSDS)		0.302	0.130	1.543
<b>Description:</b> Water Storage Distribution System (WSDS) provides the large capacity capability that is tailorable in receiving, storing, and issuing to all bulk water systems in the Army inventory. The WSDS stores and issues potable water in support of individual consumption, medical treatment, Chemical, Biological, Radiological, and Nuclear (CBRN) decontamination. It is used in conjunction with the 1,500 gph Tactical Water Purification System (1.5K TWPS) or the 3,000 gph Reverse Osmosis Water Purification Unit (3K ROWPU). It is the only program of record that is designed to store bulk water in the quantities needed for the Warfighter. The 100,000 gallon WSDS is containerized and will take the place of two 40K systems in the Composite Supply Companies.				
<b>FY 2021 Plans:</b> WSDS Technical Data Package / Engineering Development				
<b>FY 2022 Plans:</b> WSDS Pump Test Asset contract award and Pump-Off testing for contractor down select.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY22 funding increases to fund purchased of Pump Test assets and Pump-Off testing				
<b>Title:</b> Modular Fuel System (MFS) Tank Rack Module (TRM) - M107 40gpm Pump Modification Kit		-	-	0.800
<b>Description:</b> The Modular Fuel System (MFS), Tank Rack Module (TRM) is a 2,500 gallon mobile storage and distribution platform. It is configured in a 20 foot ISO frame and is capable of being transported by a Heavy Expanded Mobility Tactical Truck-Load Handling System (HEMTT-LHS) and the Palletized Load Handling System (PLS). The MFS TRM has a Stand-Alone Retail Capability, utilizing its integrated continuous use electric pump, filter separator and flow meter. It can be operate mounted on the prime mover or trailer or on the ground.				
There are currently two fielded variants of the TRM (M107 & M107A1). The M107 TRM has a 20 GPM fuel pump as compared to the 40 GPM pump on the M107A1. Modification effort will install the M107A1 pump (and correlating Filter Separator) into the M107 with result in a 100% faster pumping time.				
<b>FY 2022 Plans:</b>				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Modification pump kit engineering development, purchase of test assets and kit testing prior to contract award.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased in FY22 due to start of modification program development			
<b>Accomplishments/Planned Programs Subtotals</b>	8.755	8.707	9.367

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• MA6000: Distribution Systems, Petroleum & Water	84.527	76.722	72.296	-	72.296	-	-	-	-	-	-
• D02001: Semitrailers, tankers	-	17.082	17.985	-	17.985	-	-	-	-	-	-
• MA4502: INSTALLATION OF MODIFICATIONS	14.109	5.251	5.574	-	5.574	-	-	-	-	-	-
• MB6400: QUALITY SURVEILLANCE EQUIPMENT	-	-	0.744	-	0.744	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Develop engineering prototypes for the Petroleum Tankers, Early Entry Fluid Distribution System (E2FDS) and Load Handling System (LHS) - Compatible Water Tank Rack System (HIPPO) select Non-Development Item (NDI) based on market surveys and proposals from industry. Conduct industry days and based on additional market research will award either competitive or sole source contracts. Conduct Integrated Product Team (IPT's) and develop acquisition strategies for Water Bison and Water Bison Light, Petroleum Expeditionary Analysis Kit (PEAK), Tactical Fuel Distribution System (TFDS), Bulk Fuel Distribution System (BFDS) and Water Storage and Distribution System (WSDS), Mobile Tactical Retail Refueling System (MTRRS). Conduct developmental and operational testing where applicable for Water Bison and Water Bison Light, E2FDS, Petroleum Tankers, MTRRS, Water Storage and Distribution Systems (WSDS) 40,000 gallon and 100,000 gallon sets, PEAK, HIPPO. Conduct Source Selection Evaluation Boards (SSEBs) within the Petroleum and Water Systems portfolio. Develop documentation in support of Milestone Decisions. Will award Other Transactional Agreements (OTAs) or traditional Federal Acquisition Regulation (FAR) based contracts based on market research, industry capabilities and program risks.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed
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<b>Management Services (\$ 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>		<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>				
PM Matrix Spt / GVSC Engineering Spt	MIPR	Various TACOM : Warren, MI	-	2.815	Jan 2020	1.963	Jan 2021	2.264	Jan 2022	-		2.264	0.000	7.042	-	
<b>Subtotal</b>			-	2.815		1.963		2.264		-		2.264	0.000	7.042	N/A	

<b>Product Development (\$ 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>		<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>				
E2FDS - Tech/Ops Manuals	C/FFP	DRS SUSTAINMENT SYSTEMS, INC. : Saint Louis, MO	-	0.525	Aug 2020	0.107	Mar 2021	-		-		-	0.000	0.632	-	
PEAK - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Multiple Contractors : Multiple	-	-		0.900	Aug 2021	-		-		-	0.000	0.900	-	
BFDS - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Multiple Contractors : Multiple	-	0.902	Aug 2020	-		-		-		-	0.000	0.902	-	
TFDS - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Multiple Contractors : Multiple	-	-		1.184	Sep 2021	-		-		-	0.000	1.184	-	
WSDS - Tech Data Package - ECP Update	MIPR	GVSC : Warren, MI	-	0.061	Jan 2020	0.030	Feb 2021	-		-		-	0.000	0.091	-	
WSDS - Pump Test Assets	C/FP	TBD - Multiple Contractors : Multiple Contractors	-	-		-		0.750	Dec 2021	-		0.750	0.000	0.750	-	
HIPPO - Contract Prototype Award (OTA)	C/FFP	OTA - Multiple Contractors : Multiple	-	1.804	Feb 2020	-		-		-		-	0.000	1.804	-	
Bison - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Multiple Contractors : Multiple	-	-		1.600	Jun 2021	-		-		-	0.000	1.600	-	
MFS TRM - Kit Int. Design/ Eng. Pump Modification Upgrade + Test Assets	SS/FFP	ISOMETRICS : Reidsville, NC	-	-		-		0.200	Dec 2021	-		0.200	0.000	0.200	-	
TFDS - Ballistic Study	MIPR	TBD : TBD	-	-		-		0.120	Jan 2022	-		0.120	0.000	0.120	-	

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed
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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			
Bison Lite - Design Eng. Development / Prototyping	TBD	TBD : TBD	-	-		-		0.810	Apr 2022	-		0.810	0.000	0.810	-
<b>Subtotal</b>			-	3.292		3.821		1.880		-		1.880	0.000	8.993	N/A

<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			
E2FDS - LUT Customer Event / Maint. Demos	MIPR	TACOM : Warren, MI	-	-		0.350	Jun 2021	0.050	Nov 2021	-		0.050	0.000	0.400	-
<b>Subtotal</b>			-	-		0.350		0.050		-		0.050	0.000	0.400	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			
MTRRS - Production Qualification Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	0.249	Jul 2020	1.276	Feb 2021	-		-		-	0.000	1.525	-
MTRRS - User Jury Test	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	-		0.140	Jul 2021	-		-		-	0.000	0.140	-
MTRRS - HSL Test	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	-		0.025	Mar 2021	-		-		-	0.000	0.025	-
E2FDS - Production Qualification Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	1.434	Mar 2020	-		-		-		-	0.000	1.434	-
E2FDS - HSL Test	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	0.265	Mar 2020	-		-		-		-	0.000	0.265	-



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				L41 / Water And Petroleum Distribution - Ed							
Test and Evaluation (\$ in Millions)				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
PEAK - Prototype Dev Test - Fly Off Testing	C/FFP	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		0.676	Sep 2021	-		-		-	0.000	0.676	-
BFDS - APG - Prototype Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		0.256	Feb 2021	-		-		-	0.000	0.256	-
TFDS - Prototype Run-Off Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		1.023	Jun 2022	-		1.023	0.000	1.023	-
WSDS - Pump Off Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		0.400	Jun 2022	-		0.400	0.000	0.400	-
HIPPO - Prototype Proveout Testing PPT	SS/FFP	MICHIGAN TECHNOLOGICAL UNIVERSITY : Houghton, MI	-	0.700	Feb 2020	-		-		-		-	0.000	0.700	-
HIPPO - PQT / FAT / HSL / Transportability	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		0.200	Aug 2021	1.000	Dec 2021	-		1.000	0.000	1.200	-
Bison - Yuma - Prototype Testing	MIPR	Army Test Center : Yuma, AZ	-	-		-		0.850	Dec 2021	-		0.850	0.000	0.850	-
MFS TRM - Mod Kit Prototype Testing	TBD	TBD : TBD	-	-		-		0.500	Jun 2022	-		0.500	0.000	0.500	-
BFDS - Production Qualification Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		0.950	May 2022	-		0.950	0.000	0.950	-
PEAK - Production Qualification Testing / Cust. Test (LUT)	MIPR	GVSC : Warren, MI	-	-		-		0.450	Aug 2022	-		0.450	0.000	0.450	-
<b>Subtotal</b>			-	2.648		2.573		5.173		-		5.173	0.000	10.394	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

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
<b>Water Bison</b>																												
Water Bison Materiel Development Decision (MDD)	▲ 3 MDD																											
Water Bison Other Transactional Authority Award					▲ 10 OTA Award																							
Water Bison Prototype Developmental Testing (DT)									■ Prototype Testing / DT																			
Water Bison Milestone C									▲ 13 MS C																			
Water Bison - Light Rate Production									■ LRIP																			
Water Bison Production Qualification Testing (PQT)													■ PQT															
Water Bison Full Rate Production (FRP)																	▲ 18 FRP											
<b>Early Entry Fluid Distribution System (E2FDS)</b>																												
E2FDS Developmental Testing / Production Qualification Testing (DT/PQT)					■ DT/PQT																							
E2FDS Milestone C					▲ 9 MS C																							
E2FDS Low Rate Production (LRIP)									■ LRIP																			
E2FDS Log Demo and Limited User Test (LUT)									■ Log Demo & LUT																			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

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								
E2FDS FullRate Production (FRP)													FRP																							
<b>Modular Tactical Retail Refueling System (MTRRS)</b>																																				
MTRRS Milestone C													6 MS C																							
MTRRS Low Rate Production (LRIP)																	LRIP																			
MTRRS Production Qualification Test (PQT)																	PQT																			
MTRRS User Jury																					User Jury															
MTRRS Full Rate Production (FRP)																					FRP				FRP											
MTRRS Full Materiel Release (FMR)																													19 FMR							
<b>Petroleum Expeditionary Analysis Kit (PEAK)</b>																																				
PEAK Materiel Development Decision (MDD)													4 MDD Approved																							
PEAK Contract Prototype Award (OTA)									OTA Award																											
PEAK - Prototype Dev Test - Fly Off Testing													Prototype Testing																							
PEAK Milestone C																	14 MS C																			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

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				
PEAK LRIP Production Award													[Bar: FY22 Q3-Q4, FY23 Q1-Q2]																			
PEAK Production Qualification Testing (PQT)																					[Bar: FY22 Q3-Q4]											
PEAK Full Rate Production (FRP)																	[Triangle: FY24 Q2]															
<b>Tactical Fuel Distribution System (TFDS)</b>																																
TFDS Material Development Decision (MDD)					[Triangle: FY21 Q3]																											
TFDS OTA Award									[Bar: FY22 Q1-Q2]																							
TFDS OTA Prototype Run-Off Testing									[Bar: FY22 Q3-Q4]																							
TFDS Milestone C													[Triangle: FY23 Q3]																			
TFDS Low Rate Production (LRIP)													[Bar: FY23 Q3-Q4, FY24 Q1-Q2]																			
TFDS Production Qualification Testing (PQT)													[Bar: FY23 Q4, FY24 Q1-Q2]																			
TFDS Full Rate Production (FRP)																					[Triangle: FY25 Q3]											
<b>Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)</b>																																
HIPPO Contract Award (OTA)	[Triangle: FY20 Q1]																															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

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
HIPPO Developmental Test (DT)				█																								
HIPPO Production Award							▲																					
HIPPO Production Qualification Testing (PQT)											█																	
HIPPO Full Rate Production (FRP)															▲													
<b>Bulk Fuel Distribution System (BFDS)</b>																												
BFDS Materiel Development Decision (MDD)	▲																											
BFDS Other Transaction Authority (OTA) Award							█																					
BFDS (OTA) Testing							█																					
BFDS Milestone C											▲																	
BFDS Low Rate Production (LRIP)											█																	
BFDS Production Qualification Testing (PQT)											█																	
BFDS Full Rate Production (FRP)															█													
<b>Water Storage Distribution System (WSDS)</b>																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed

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
WSDS Materiel Development Decision ( MDD)	2 MDD																											
WSDS Milestone C								1 MSC																				
WSDS Pump Test Assets Contract Award									■																			
WSDS Pump Off Testing										■																		
WSDS Low Rate Production (LRIP)											■																	
WSDS Production Qualification Testing (PQT)												■																
WSDS Full Rate Production (FRP)																16 FRP												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Water Bison	1	2022	4	2025
Water Bison Materiel Development Decision (MDD)	2	2020	2	2020
Water Bison Other Transactional Authority Award	3	2021	3	2021
Water Bison Prototype Developmental Testing (DT)	1	2022	3	2022
Water Bison Milestone C	3	2022	3	2022
Water Bison - Light Rate Production	4	2022	4	2023
Water Bison Production Qualification Testing (PQT)	2	2023	4	2023
Water Bison Full Rate Production (FRP)	4	2023	4	2023
Early Entry Fluid Distribution System (E2FDS)	1	2018	4	2023
E2FDS Developmental Testing / Production Qualification Testing (DT/PQT)	1	2021	3	2021
E2FDS Milestone C	3	2021	3	2021
E2FDS Low Rate Production (LRIP)	3	2021	1	2022
E2FDS Log Demo and Limited User Test (LUT)	4	2021	1	2022
E2FDS FullRate Production (FRP)	2	2022	4	2023
Modular Tactical Retail Refueling System (MTRRS)	1	2017	4	2022
MTRRS Milestone C	2	2020	2	2020
MTRRS Low Rate Production (LRIP)	3	2020	1	2022
MTRRS Production Qualification Test ( PQT)	1	2021	4	2021
MTRRS User Jury	4	2021	4	2021
MTRRS Full Rate Production (FRP)	1	2022	1	2028
MTRRS Full Materiel Release (FMR)	1	2024	1	2024
Petroleum Expeditionary Analysis Kit (PEAK)	1	2021	3	2023



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L41 / Water And Petroleum Distribution - Ed
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Events	Start		End	
	Quarter	Year	Quarter	Year
PEAK Materiel Development Decision (MDD)	2	2020	2	2020
PEAK Contract Prototype Award (OTA)	4	2021	2	2022
PEAK - Prototype Dev Test - Fly Off Testing	2	2022	3	2022
PEAK Milestone C	3	2022	3	2022
PEAK LRIP Production Award	3	2022	4	2023
PEAK Production Qualification Testing (PQT)	4	2022	2	2023
PEAK Full Rate Production (FRP)	2	2024	2	2024
Tactical Fuel Distribution System (TFDS)	1	2020	1	2025
TFDS Materiel Development Decision (MDD)	1	2021	1	2021
TFDS OTA Award	1	2022	4	2022
TFDS OTA Prototype Run-Off Testing	3	2022	1	2023
TFDS Milestone C	3	2023	3	2023
TFDS Low Rate Production (LRIP)	4	2023	3	2025
TFDS Production Qualification Testing (PQT)	2	2024	1	2025
TFDS Full Rate Production (FRP)	3	2025	3	2025
Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)	3	2020	4	2025
HIPPO Contract Award (OTA)	2	2020	2	2020
HIPPO Developmental Test (DT)	4	2020	1	2021
HIPPO Production Award	2	2021	2	2021
HIPPO Production Qualification Testing (PQT)	4	2021	3	2022
HIPPO Full Rate Production (FRP)	4	2022	4	2022
Bulk Fuel Distribution System (BFDS)	1	2020	2	2028
BFDS Materiel Development Decision (MDD)	1	2020	1	2020
BFDS Other Transaction Authority (OTA) Award	4	2020	4	2021
BFDS (OTA) Testing	2	2021	4	2021

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L41 / <i>Water And Petroleum Distribution - Ed</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
BFDS Milestone C	1	2022	1	2022
BFDS Low Rate Production (LRIP)	2	2022	3	2023
BFDS Production Qualification Testing (PQT)	3	2022	1	2023
BFDS Full Rate Production (FRP)	3	2023	4	2026
Water Storage Distribution System (WSDS)	4	2019	3	2028
WSDS Materiel Development Decision ( MDD)	1	2020	1	2020
WSDS Milestone C	4	2021	4	2021
WSDS Pump Test Assets Contract Award	1	2022	2	2022
WSDS Pump Off Testing	3	2022	3	2022
WSDS Low Rate Production (LRIP)	4	2022	3	2023
WSDS Production Qualification Testing (PQT)	1	2023	2	2023
WSDS Full Rate Production (FRP)	3	2023	3	2023

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> L43 / ENGINEER SUPPORT EQUIPMENT - ED			
<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>
L43: ENGINEER SUPPORT EQUIPMENT - ED	-	1.191	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

These systems provide state-of-the-art deployable, combat engineer and construction equipment and critical life support along with engineer safety and special unit support equipment supporting the joint warfighter. These programs enhance combat and military operations minimize transportation requirements and reduce the logistical footprint by eliminating obsolete equipment and reducing the number of programs. The Combat Engineer and Construction equipment consists of the Surveying, Firefighting Individual Requirements Equipment Support (FIRES), Fire Protection Equipment Type I, II and III, Tactical Fire Fighting Truck Tools (TFTT), Family of Power Utility Kits (FoPUK), and Soldier Portable Kits, Lineman's Tool Kit, Concrete and Masonry, Electricians, Plumbers, Pipefitters, Family of Light Sets (FoLS), Airfield Damage Repair Kit (ADRK), Diving Equipment, Surface Swimmer Support Sets, Surface Supplied Diving Set, procurement of new Technical/Special Tools, Pioneer Support Set, and the Pioneer Land Clearing and Building Erection Set. Project will explore Additive Manufacturing for Engineer systems. Funding will support the procurement of market samples and testing for Soldier Portable Sets, Kits, and Outfits (SKO), Special Tools initiative, and critical life support equipment such as the Deep Sea Set, Underwater Construction Set, Photo Support Set, Diver Supplemental Issue Set, Closed Circuit Scuba Set, Supervisor Propulsion Emergency and Recovery SCUBA (SPEaRS), Divers' Supplemental Issue Set(DSIS), Vertical Skills Engineer Construction Kit (VSECK), and Family of Boats and Motors (FOBAM).

**BUDGET ITEM JUSTIFICATION:** This project supports development, demonstration, testing and evaluation within the Combat Engineer and Construction Support Equipment arena. These items include critical life support equipment such as diving, firefighting, fire suppression, urban and dense urban operations, subterranean operations, breathable air compressors, and emergency and recovery sets along with engineer safety and special unit support equipment and photo support sets. Funding shall allow for development of dual use systems that support wartime use by Soldiers to include Special Forces and peacetime operations that include national disaster relief and homeland security operations. Much of this equipment has an inherent short Economic Useful Life (EUL). Investments used to revise, update and obtain equipment within this portfolio has resulted in increased readiness, safety, and effectiveness and reductions in footprint.

No FY22 funding for this project. Funding supports modernization of the current Ordnance/Engineer equipment by investigating technology insertions due to but not limited to obsolescence and technology innovations. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Family of Power Utility Kits (FoPUK)	0.308	-	-
<b>Description:</b> Conduct Market Research, Develop, and Initiate procurement activities for Family of Power Utility Kits (FoPUK).			
<b>Title:</b> Supervisory Propulsion, Emergency and Recovery Set (SPEaRS)	0.585	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Description:</b> Prepare documentation, conduct market research, procure production representative, and complete required testing.			
<b>Title:</b> Program Management Support	0.098	-	-
<b>Description:</b> Program support costs associated with emerging program development.			
<b>Title:</b> Family of Boats and Motors	0.200	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	1.191	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• R70001: <i>Family Of Engr Combat and Construction Sets</i>	11.451	23.324	36.163	-	36.163	-	-	-	-	-	-
• R12001: <i>Family of Boats and Motors</i>	5.745	5.289	-	-	-	-	-	-	-	-	-
• ML5301: <i>Items Less Than \$5M (Eng Spt)</i>	4.128	8.014	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Programs will progress from pre Milestone Decision Document (MDD) activities through market research, market samples, Description for Purchase, development, production representative systems and testing. Modernization and Optimization of existing tools and testing of market samples will progress from Engineering and Manufacturing Development (EMD) and transition into production. All efforts will support the two level maintenance concept utilizing commercial technologies and incorporating them into SKOs to support next generation weapon and support systems.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L43 / ENGINEER SUPPORT EQUIPMENT - ED
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<b>Management Services (\$ 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			
Program Management Support	MIPR	PM SKOT : MI	-	0.098	Dec 2019	-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			-	0.098		-		-		-		-	Continuing	Continuing	N/A

<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			
Engineering and Quality Assurance - FoPuk	MIPR	ECBC/ARDEC : Rock Island, IL	-	0.068	Oct 2019	-		-		-		-	Continuing	Continuing	-
Engineer and Quality Assurance Support - SPEARS	MIPR	ECBC/ARDEC : Rock Island, IL	-	0.132	Oct 2019	-		-		-		-	Continuing	Continuing	-
Packaging Support for Engineer Portfolio SKOs	MIPR	ECBC : Rock Island, IL	-	0.180	Oct 2019	-		-		-		-	Continuing	Continuing	-
Logistics	TBD	TACOM : Warren, MI	-	0.513	Apr 2020	-		-		-		-	0.000	0.513	-
<b>Subtotal</b>			-	0.893		-		-		-		-	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			
Family of Boats and Motors	TBD	TBD : TBD	-	0.200	May 2021	-		-		-		-	0.000	0.200	-
<b>Subtotal</b>			-	0.200		-		-		-		-	0.000	0.200	N/A

	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>			-	1.191	0.000	-	-	-	Continuing	Continuing	N/A

**Remarks**

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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev		<b>Project (Number/Name)</b> L43 / ENGINEER SUPPORT EQUIPMENT - ED	

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
Market research, develop, build, test Family of Power Utility Kit	█				█																							
Market research, develop, build, test SPEARS	█				█																							
Test for Family of Boats and Motors.	█				█																							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L43 / <i>ENGINEER SUPPORT EQUIPMENT - ED</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Market research, develop, build, test Family of Power Utility Kit	1	2017	4	2020
Market research, develop, build, test SPEARS	1	2019	4	2020
Test for Family of Boats and Motors.	3	2021	3	2021

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>				<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</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>
L46: <i>Maintenance Support Equipment</i>	-	8.218	1.300	0.766	-	0.766	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Mobile Maintenance Equipment provides state of the art, deployable, vehicle-mounted, Soldier portable and containerized shelter tool systems supporting the readiness of the Joint warfighter directly supporting Soldier Lethality, Next Generation Combat Vehicle (NGCV) and Long Range Precision Fires (LRPF), as well as, addressing GAPs 10 and 17. These systems are equipped with industrial quality tools required for Two Level Maintenance that reduce common tool redundancy, provide tool standardization, minimize transportation requirements, reduce logistical footprint, and are backed by a Lifetime Warranty/Replacement Program which reduces sustainment costs. This is accomplished by employing a system of systems approach to maintenance acquisition. The System of Systems approach builds a maintenance capability upon each system, allowing a logical and natural approach to the Army's overall two level maintenance strategy. These inter-connected systems distributed throughout the Army at multiple levels and echelons provide a holistic repair capability in all scenarios and environments. These systems provide the Maintenance and Combat Commanders an unprecedented capability to repair wheeled, tracked, aviation, ground support and weapons systems on site at one location at one time. This approach to maintenance acquisition increases efficiencies and supports the current force while providing modular configurations designed to meet the specific needs of the Army maintainer in today's complex transforming environment.

**BUDGET ITEM JUSTIFICATION:** The need to develop and maintain a System of System maintenance approach is critical for maintaining readiness due to the growing complexity of today's military equipment, operational tempo, modularity, and current and evolving Tactics Techniques and Procedures (TTPs). The individual maintenance systems are comprehensive, interconnected and capable of solving and repairing any maintenance problems. The System of Systems approach does not advocate specific tools, methods or practices; instead it seeks to promote a streamlined comprehensive set of systems for solving maintenance challenges where the interactions of doctrine, technology, time and tactics techniques and procedures are the primary drivers. Funding for projects shall include test article procurement and testing of Soldier portable maintenance Sets, Kits, and Outfits (SKOs), load banks and refrigeration tool kit; investigation of new technologies for next generation mobile maintenance equipment shop sets including the Shop Equipment Welding (SEW) and Shop Equipment Contact Maintenance (SECM); development of additional Standard Automotive Tool Set (SATS) maintenance modules, Armament Repair Shop Set (ARSS), Mobile Ammunition Processing Facility (MAPF), Forward Repair System (FRS), Special Tools initiatives, shelter mounted system development; packaging development; and technical support for emerging Joint Capabilities Integration and Development System (JCIDS) materiel requirements documents. Additive Manufacturing increased capabilities to the Metal Working and Machining Shop Set (MWMSS) to include a polymer and metal printing and associated digital library capability. Modernization upgrades increase effectiveness while improving efficiency, reliability and maintainability while supporting emerging Army systems as well as using lower cost set components.

Funding supports modernization of the current Ordnance equipment by investigating technology insertions due to but not limited to obsolescence and technology innovations. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement concepts.



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L46 / Maintenance Support Equipment

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> MWMSS Additive Manufacturing <b>Description:</b> Develop Additive Manufacturing capability for Army systems, Limited User Experiment and Evaluation. <b>FY 2021 Plans:</b> Expeditionary Metal Additive Manufacturing options. <b>FY 2022 Plans:</b> Expeditionary Metal Additive Manufacturing options. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease of \$510 from FY21 to FY22.	-	1.300	0.766
<b>Title:</b> Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM) ATR	3.218	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	3.218	1.300	0.766

	<b>FY 2020</b>	<b>FY 2021</b>
<b>Congressional Add:</b> Next Generation High Mobility Multipurpose Wheeled Vehicle (HMMWV) Shop Equipment Contact Maintenance (SECM) <b>FY 2020 Accomplishments:</b> Testing, Product Development, Engineering, and Logistical efforts.	5.000	-
<b>Congressional Adds Subtotals</b>	5.000	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• ML5345: Items Less Than \$5.0M (Maint Eq)	5.608	5.570	-	-	-	-	-	-	-	-	-
• G05301: Mobile Maintenance Equipment Systems	140.053	168.106	14.756	-	14.756	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
 Programs will progress from pre Milestone Decision Document (MDD) activities through market research, market samples, Description for Purchase, development, production representative systems and testing. Modernization and Optimization of existing tools and testing of market samples will progress from Engineering and

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>
<p>Manufacturing Development (EMD) and transition into production. All efforts will support the two level maintenance concept utilizing commercial technologies and incorporating them into SKOs to support next generation weapon and support systems.</p>		

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L46 / Maintenance Support Equipment
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management	MIPR	PM SKOT : Warren, MI	0.312	0.025	Mar 2020	0.095	Feb 2021	0.057	Oct 2021	-		0.057	Continuing	Continuing	-
<b>Subtotal</b>			0.312	0.025		0.095		0.057		-		0.057	Continuing	Continuing	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Armament Repair Shop Set 2 design and development	MIPR	Tobyhanna Army Depot/TBD : Tobyhanna, PA	0.464	-		-		-		-		-	0.000	0.464	-
Develop Rapid Deployment Sets, Kits, & Outfits - Special Tool Initiative.	MIPR	CCDC : Rock Island, IL	0.300	-		-		-		-		-	0.000	0.300	-
Refrigeration Tool Kit (RTK) Logistics Demonstration	MIPR	CCDC : Rock Island, IL	0.394	-		-		-		-		-	0.000	0.394	-
Modernization/Redesign efforts of Truck/Trailer transported shelters for next generation systems	MIPR	CCDC : Rock Island, IL	2.025	-		-		-		-		-	0.000	2.025	-
Procure Ground Based Special Tools in support of Tactical Vehicles	MIPR	PM SKOT : Harrison, MI	0.343	-		-		-		-		-	0.000	0.343	-
Next Generation Shop Equipment Welding (SEW) concept design and development	MIPR	CCDC : Rock Island, IL	2.493	-		-		-		-		-	0.000	2.493	-
Additive Manufacturing Hardware	Various	TBD : TBD	-	-		0.856	Feb 2021	0.485	Dec 2021	-		0.485	0.000	1.341	-
Product Dev Next Generation Shop	MIPR	CCDC : Rock Island, IL	-	6.062	Mar 2020	-		-		-		-	0.000	6.062	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				L46 / Maintenance Support Equipment							
Product Development (\$ in Millions)				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
Equipment Contact Maintenance															
<b>Subtotal</b>			6.019	6.062		0.856		0.485		-		0.485	0.000	13.422	N/A
Support (\$ in Millions)				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
Engineer and Quality Assurance in support of SKOs	MIPR	CCDC : (IL, MI)	1.563	-		-		-		-		-	Continuing	Continuing	-
Packaging Support	MIPR	CCDC Armament Center : Rock Island, IL	0.231	-		-		-		-		-	Continuing	Continuing	-
Next Generation Shop Equipment Welding (SEW) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	0.543	-		-		-		-		-	0.000	0.543	-
Refrigeration Tool Kit (RTK) support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	0.153	-		-		-		-		-	0.000	0.153	-
Armament Repair Shop Set 2 support	MIPR	ECBC / ARDEC / PM SKOT : (IL, MI)	0.332	-		-		-		-		-	0.000	0.332	-
Additive Manufacturing support	MIPR	ECBC : IL	0.300	-		0.349	Feb 2021	0.224	Oct 2021	-		0.224	Continuing	Continuing	-
Fire Suppression Refill System (FSRS) support	MIPR	PM SKOT : MI	0.040	-		-		-		-		-	0.000	0.040	-
Next Generation Shop Equipment Contact Maintenance support	MIPR	ECBC/PM SKOT : (IL, MI)	0.195	-		-		-		-		-	0.000	0.195	-
Special Tools support	MIPR	ECBC : IL	0.015	-		-		-		-		-	0.000	0.015	-
<b>Subtotal</b>			3.372	-		0.349		0.224		-		0.224	Continuing	Continuing	N/A



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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</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
Develop, Procure, and Test Next Generation Shop, Equipment V	[Redacted]				[Redacted]																							
Develop, Procure, and Test Additive Manufacturing	[Redacted]				[Redacted]				[Redacted]																			
Develop, Procure, and Test Next Generation Shop Equipment C	[Redacted]				[Redacted]																							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L46 / <i>Maintenance Support Equipment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Develop, Procure, and Test Next Generation Shop, Equipment Welding (SEW)	4	2016	3	2020
Develop, Procure, and Test Additive Manufacturing	3	2016	4	2023
Develop, Procure, and Test Next Generation Shop Equipment Contact Maintenance	1	2019	4	2021

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> L47 / Improved Environmental Control Units Ed			
<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>
L47: Improved Environmental Control Units Ed	-	1.032	1.062	1.801	-	1.801	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This line supports the Army Network Modernization Strategy Line of Effort #4 (Command Post). Program develops/integrates Improved Environmental Control Units (IECUs) supporting existing and new requirements coming from the Command Post Integrated Infrastructure (CPI2), Army Standard Family of Rigid Wall Shelters (ASF-RWS) and other applications. In addition, it supports the development of critical Chemical Biological Radiological and Nuclear (CBRN) modifications required to support the Chemically Protected Deployable Medical System and other systems requiring this capability.

The Improved Environmental Control Units (IECU) program will provide updates to replace the current Military Standard Family of Environmental Control Units (ECUs) with the new generation IECUs using environmentally-suitable refrigerants to eliminate Ozone-Depleting Chemicals (ODCs) and reduce Global Warming Potential (GWP). The IECUs will provide improved cooling, heating and dehumidification to Soldiers and critical equipment systems in combat, combat support, combat service support units, and field hospitals. The IECUs are required to replace the currently fielded ECUs in order to comply with statutory and regulatory mandates on the use of Class II ODCs (such as HCFC-22) and address increasing restrictions on high GWP chemicals. Technical improvements over existing ECUs will yield significant fuel and weight savings, reduction in scheduled maintenance and increased reliability. Funding also provides applications engineering support to integration development for shelter/trailer platforms to assist users and help further standardize cooling units in the field. Funding also supports developing initial prototypes to enable refinement of operational requirements and technology refreshment, and design improvements to address issues and support future sustainment. Potential expansion of product variants will further accommodate various users.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Technology Development	0.393	0.277	0.800
<b>Description:</b> Development and integration of Improved Environmental Control Units (IECU) in the range of 9-60K BTUH to support integrated shelter systems.			
<b>FY 2021 Plans:</b> Conduct testing of 60K IECU CB variant and complete final design documentation.			
<b>FY 2022 Plans:</b> Develop performance enhancements for 9/18/36K IECUs to improve capacity, carryover, efficiency, and in-rush characteristics in accordance with operational requirements.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Funds moved to support development of in-house modeling accomplishments.				
<b>Title:</b> Government System Test and Evaluation		0.188	0.250	0.500
<b>Description:</b> Testing of prototype performance for multiple variants of the IECUs and soft wall shelter ECUs.				
<b>FY 2021 Plans:</b> Complete testing at Aberdeen Test Center (ATC) or similar facility (e.g. Eglin AFB) to evaluate capabilities and performance of 60K IECU CB Variant.				
<b>FY 2022 Plans:</b> Design and testing for potential product improvements to IECU family (Block II) and support User Engagements.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funds moved from Technology Development to support Testing accomplishments.				
<b>Title:</b> Other Contract and Government Agency		0.264	0.235	0.301
<b>Description:</b> Support engineering, logistics, and testing efforts for multiple ECU variants, and integrated heating/cooling units. Match and right-size current IECU family to applications and/or develop and test new variants to provide the most efficient system solution.				
<b>FY 2021 Plans:</b> Complete validation of baseline TDP for 60K IECU CB variant, conduct limited performance testing and PCA. Concept development for IECU integration in support of CPI2 and Army Standard Family of Rigid Wall Shelters.				
<b>FY 2022 Plans:</b> Concept development for IECU integration and/or new variants in support of IECU Data Interchange (DI) customers.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funds moved to support Testing accomplishments.				
<b>Title:</b> Government Program Management		0.187	0.300	0.200
<b>Description:</b> Provide oversight and management of engineering, logistics, contracts, and testing efforts for the IECU family and multiple user engagements in preparation for IECU variants to transition to production. Provide oversight and management of follow-on IECU variants.				
<b>FY 2021 Plans:</b>				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev	<b>Project (Number/Name)</b> L47 / Improved Environmental Control Units Ed

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue to provide oversight and management of engineering, logistics, contracts, and testing efforts for next generation IECU system development efforts including 60K IECU CB 2 and 9/18/36K IECU programs.			
<b>FY 2022 Plans:</b> Continue to provide oversight and management of engineering, logistics, contracts, and testing efforts for next generation IECU system development efforts including 60K IECU CB 2 and 9/18/36K IECU programs.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funds increased to support development efforts.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.032	1.062	1.801

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MF9303: IMPROVED ENVIRONMENTAL CONTROL UNITS	5.876	8.570	7.116	-	7.116	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
Support modernization and technology insertions required to adapt ECUs future integrated system heating and cooling requirements in support of Force 2025 and the Command Post Integrated Infrastructure (CPI2) and chemically protected deployable medical system. Evaluate requirements versus existing ECU Fleet and develop/test initial prototypes of ECUs in support of future integrated system heating and cooling requirements. This effort will support the development of Purchase Descriptions (PDs) and Technical Data Packages (TDPs) for eventual competitive procurement.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				L47 / Improved Environmental Control Units Ed							
Management Services (\$ in Millions)				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
9,18 and 36K Improved Environmental Control Unit (IECU)	Various	PM E2S2 : various	1.428	-		0.150		0.100		-		0.100	0.000	1.678	Continuing
60K IECU	Various	PM E2S2 : various	0.337	0.186		0.150		0.100		-		0.100	0.000	0.773	-
<b>Subtotal</b>			1.765	0.186		0.300		0.200		-		0.200	0.000	2.451	N/A
Product Development (\$ in Millions)				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
9,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	NSSC : Natick, MA	2.064	0.129		0.150		0.800		-		0.800	0.000	3.143	Continuing
60K IECU	MIPR	ARDEC PIF : Huntsville. AL	4.032	0.430		0.127		-		-		-	0.000	4.589	-
<b>Subtotal</b>			6.096	0.559		0.277		0.800		-		0.800	0.000	7.732	N/A
Support (\$ in Millions)				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
9, 18 and 36K Improved Environmental Control Unit (IECU)	MIPR	CERDEC : Ft. Belvoir, VA	2.829	-		-		0.301		-		0.301	0.000	3.130	-
60K IECU	Various	CERDEC : Fort Belvoir, VA	4.407	-		0.235		-		-		-	0.000	4.642	-
<b>Subtotal</b>			7.236	-		0.235		0.301		-		0.301	0.000	7.772	N/A



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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</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
Fabricated 60K IECU CB2 Test Samples	█																											
Test the modified 60K IECU CB 2 units					█																							
Develop performance enhancements for 9/18/36K IECUs									█				█															
Design and testing for potential Data Interchange customer support									█				█				█				█							
Fabricate 60K IECU prototypes	█																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> L47 / <i>Improved Environmental Control Units Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Fabricated 60K IECU CB2 Test Samples	1	2020	4	2020
Test the modified 60K IECU CB 2 units	1	2021	4	2021
Develop performance enhancements for 9/18/36K IECUs	1	2022	4	2024
Design and testing for potential Data Interchange customer support	1	2022	4	2026
Fabricate 60K IECU prototypes	2	2020	1	2021

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604804A / Logistics and Engineer Equipment - Eng Dev				<b>Project (Number/Name)</b> VR7 / Combat Service Support Systems			
<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>
VR7: <i>Combat Service Support Systems</i>	-	-	-	2.101	-	2.101	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This is a new start in FY 2022.

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

This project supports Engineering and Manufacturing Development (EMD) of critical soldier support and sustainment systems that provide more endurance and agility to combat operations enabling success of Army Expeditionary Forces in future multi-domain scenarios. Project includes highly mobile shelter systems (rigid and soft wall), expeditionary base camp subsystems, field service systems, mortuary affairs equipment, field heaters, and other combat service support equipment. These systems will fill identified theater capability gaps, improve safety, improve unit sustainability, improve resource and energy efficiency; address environmental impacts, and increase combat effectiveness. This project supports Engineering and Manufacturing Development (EMD), Prototyping, and testing of critical tactical support systems that support mobile Joint Service command and control, medical, force projection and maintenance platforms. This project develops critical enablers that support the Army Campaign Plan and Army Modernization Strategy by maintaining readiness through fielding and integrating new equipment. This project also ensures Army Expeditionary Forces are capable of rapid deployment while reducing sustainment requirements, related Combat Support/Combat Service Support (CS/CSS) demands in lift, combat zone footprint, and costs for logistical support.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Army Standard Family of Rigid Wall Shelters (ASF-RWS)	-	-	2.101
<b>Description:</b> The ASF-RWS program conducts formal development to modernize and standardize three variants of Army rigid wall shelters by incorporating the latest material and manufacturing technologies. Doing so will reduce the proliferation of non-standard shelters and their associated logistics burden across the Services. The program produces approved Technical Data Packages (TDPs) to support procurements by materiel developers and Program Managers (PMs) requiring rigid wall shelters. Once developed and formally type-classified, ASF-RWS shelter procurements are customer-funded by PMs as a cost under their program(s). The ASF-RWS program is structured as three sub-programs, each focused on a shelter variant:  Phase One (P1) ? Expandable/Non-Expandable Variant Phase Two (P2) ? Vehicle Mounted Variant Phase Three (P3) ? Panelized Variant			
<b>FY 2022 Plans:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Obtain Development Decision, award development contract and initiate design development for ASF-RWS Phase 2 - Vehicle Mounted Variant.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> No funding received in FY21. RDT&E funding reinstated in FY22 to resume ASF-RWS program development.				
<b>Accomplishments/Planned Programs Subtotals</b>		-	-	2.101
<b>C. Other Program Funding Summary (\$ in Millions)</b> N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b> The acquisition strategy is to accelerate product development and testing to transition into production.				



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604804A / Logistics and Engineer Equipment - Eng Dev				VR7 / Combat Service Support Systems							
Management Services (\$ in Millions)				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
Project Management Support	Various	PM Force Sustainment Systems : Natick, MA	2.609	-		-		0.301		-		0.301	0.000	2.910	-
<b>Subtotal</b>			2.609	-		-		0.301		-		0.301	0.000	2.910	N/A
Product Development (\$ in Millions)				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
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	2.000	-		-		1.800		-		1.800	0.000	3.800	-
<b>Subtotal</b>			2.000	-		-		1.800		-		1.800	0.000	3.800	N/A
Test and Evaluation (\$ in Millions)				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
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	0.582	-		-		-		-		-	0.000	0.582	-
<b>Subtotal</b>			0.582	-		-		-		-		-	0.000	0.582	N/A
<b>Project Cost Totals</b>			5.191	-		0.000		2.101		-		2.101	0.000	7.292	N/A
<b>Remarks</b>															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</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
ASF-RWS: Award OTA Elements 2&3, prototype for ASF-RWS P1	██████████																											
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P1					██████████																							
ASF-RWS: Prepare for and execute MS C / TC-STD decision for ASF-RWS P1					██████████																							
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P1									▲ 1																			
ASF-RWS: Achieve development decision for ASF-RWS P2									▲ 2																			
ASF-RWS: Prepare development contract, design & prototype for ASF-RWS P2					██████████																							
ASF-RWS: Award development contract for ASF-RWS P2									▲ 3																			
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P2													██████████															
ASF-RWS: Prepare for and execute MS C / TC-STD decision for ASF-RWS P2													██████████															
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P2																	▲ 4											
ASF-RWS: Achieve development decision for ASF-RWS P3																					▲ 5							
ASF-RWS: Prepare development contract, design & prototype for ASF-RWS P3																	██████████											
ASF-RWS: Award developmental contract for ASF-RWS P3																					▲ 6							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604804A / <i>Logistics and Engineer Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> VR7 / <i>Combat Service Support Systems</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ASF-RWS: Award OTA Elements 2&3, prototype for ASF-RWS P1	4	2019	4	2020
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P1	2	2021	4	2021
ASF-RWS: Prepare for and execute MS C / TC-STD decision for ASF-RWS P1	2	2021	4	2021
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P1	1	2022	1	2022
ASF-RWS: Achieve development decision for ASF-RWS P2	1	2022	1	2022
ASF-RWS: Prepare development contract, design & prototype for ASF-RWS P2	3	2021	1	2022
ASF-RWS: Award development contract for ASF-RWS P2	2	2022	2	2022
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P2	3	2023	1	2024
ASF-RWS: Prepare for and execute MS C / TC-STD decision for ASF-RWS P2	3	2023	3	2024
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P2	3	2024	3	2024
ASF-RWS: Achieve development decision for ASF-RWS P3	2	2025	2	2025
ASF-RWS: Prepare development contract, design & prototype for ASF-RWS P3	3	2024	1	2025
ASF-RWS: Award developmental contract for ASF-RWS P3	2	2025	2	2025

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Communications Systems - Eng Dev</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	-	12.077	10.674	20.121	-	20.121	-	-	-	-	-	-
593: <i>Joint Battle Command - Platform (JBC-P)</i>	-	12.077	10.674	20.121	-	20.121	-	-	-	-	-	-

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

This funding line is directly aligned to the Army Network Modernization Strategy LOE 2, Common Operating Environment. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Joint Battle Command - Platform (JBC-P) supports the N-CFT Line Of Effort (LOE) 2 by utilizing:

- Interoperable data, message, and waveforms
- Integration with Joint Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) and strike capabilities
- Sensors and applications that enable operations across domains

The JBC-P program is the cornerstone of Joint Forces Command and Control (C2) Situational Awareness (SA) and communications. JBC-P includes a network which enables the movement of data and provides secure Blue Force Tracking (BFT) capability in Platforms and Command Posts, providing soldiers and commanders a map-based Common Operating Picture of the battlefield, as a result, reducing fratricide.

PdM JBC-P, under PM Mission Command (MC), is collaborating with the C5ISR Space and Terrestrial Communications Directorate (S&TCD) on evolving the BFT network. Systems engineering efforts continue to develop the evolution path of the BFT network, and the introduction of a Modular Open Systems Approach (MOSA). Using an Other Transaction Authority (OTA) construct, those efforts are intended to inform a BFT-3 full and open solicitation Request for Prototype Proposal (RPP) to industry in FY 2021.

FY 2022 funding supports the BFT-3 standard transceiver and encryption device development contracts, and systems engineering efforts to continue prototype development for BFT-3. Support will include the integration of the BFT modular waveform and line of sight waveform on the transceiver, integration of the transceiver and encryption device to each mounted platform, interoperability with the BFT-2 Satellite Network Control Center (SNCC) and Satellite Ground Station (SGS), and upgrade of the Waveform/Network Virtualization for the BFT network to support the new modular waveform and line of sight waveform. A Preliminary Design Review (PDR) and Critical Design Review (CDR) will also be conducted for the standard transceiver and encryption device development.

JBC-P RDT&E resources are used to improve JBC-P hardware, specifically the transceiver and encryption device, enhancing network performance and resiliency; while Mounted Computing Environment (MCE) RDT&E is used to improve and add software applications.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Communications Systems - Eng Dev</i>
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<b>B. Program Change Summary (\$ in Millions)</b>	<b><u>FY 2020</u></b>	<b><u>FY 2021</u></b>	<b><u>FY 2022 Base</u></b>	<b><u>FY 2022 OCO</u></b>	<b><u>FY 2022 Total</u></b>
Previous President's Budget	12.595	11.079	20.370	-	20.370
Current President's Budget	12.077	10.674	20.121	-	20.121
Total Adjustments	-0.518	-0.405	-0.249	-	-0.249
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.518	-0.405			
• Adjustments to Budget Years	-	-	-0.249	-	-0.249

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Communications Systems - Eng Dev</i>				<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</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>
593: <i>Joint Battle Command - Platform (JBC-P)</i>	-	12.077	10.674	20.121	-	20.121	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This funding line is directly aligned to the Army Network Modernization Strategy LOE 2, Common Operating Environment. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Joint Battle Command - Platform (JBC-P) supports the N-CFT Line Of Effort (LOE) 2 by utilizing:

- Interoperable data, message, and waveforms
- Integration with Joint Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) and strike capabilities
- Sensors and applications that enable operations across domains

The JBC-P program is the cornerstone of Joint Forces Command and Control (C2) Situational Awareness (SA) and communications. JBC-P includes a network which enables the movement of data and provides secure Blue Force Tracking (BFT) capability in Platforms and Command Posts, providing soldiers and commanders a map-based Common Operating Picture of the battlefield, as a result, reducing fratricide.

PdM JBC-P, under PM Mission Command (MC), is collaborating with the C5ISR Space and Terrestrial Communications Directorate (S&TCD) on evolving the BFT network. Systems engineering efforts continue to develop the evolution path of the BFT network, and the introduction of a Modular Open Systems Approach (MOSA). Using an Other Transaction Authority (OTA) construct, those efforts are intended to inform a BFT-3 full and open solicitation Request for Prototype Proposal (RPP) to industry in FY 2021.

FY 2022 funding supports the BFT-3 standard transceiver and encryption device development contracts and systems engineering efforts to continue prototype development for BFT-3. Support will include the integration of the BFT modular waveform and line of sight waveform on the transceiver, integration of the transceiver and encryption device to each mounted platform, interoperability with the BFT-2 Satellite Network Control Center (SNCC) and Satellite Ground Station (SGS), and upgrade of the Waveform/Network Virtualization for the BFT network to support the new modular waveform and line of sight waveform. A Preliminary Design Review (PDR) and Critical Design Review (CDR) will also be conducted for the standard transceiver and encryption device development.

JBC-P RDT&E resources are used to improve JBC-P hardware, specifically the transceiver and encryption device, enhancing network performance and resiliency; while Mounted Computing Environment (MCE) RDT&E is used to improve and add software applications.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Comm unications Systems - Eng Dev</i>	<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Software/Systems Engineering</p> <p><b>Description:</b> Perform Software/Systems Engineering in support of the development of JBC-P capabilities, applications, and services, to include, but not limited to, conducting engineering studies, architecture development (both software and network), system analyses, technical readiness assessments, technical interchange meetings/events, and development of related reports and other deliverables.</p> <p><b>FY 2021 Plans:</b> Continue to conduct Systems Engineering, and prototype design for BFT-3 transceiver and encryption device, to include the development and integration of the BFT-3 transceiver running the BFT modular waveform, interoperability with the BFT 2 Satellite Network Control Center (SNCC) and Satellite Ground Station (SGS), and upgrade the Waveform/Network Virtualization for the BFT network to support the new modular waveform. Funding will also support the BFT-3 transceiver and encryption device development awards.</p> <p><b>FY 2022 Plans:</b> Funding supports BFT-3 transceiver and encryption device development contracts and systems engineering efforts to continue prototype development for BFT-3. Support will include the integration of the BFT modular waveform and line of sight waveform on the transceiver, integration of the transceiver and encryption device to each mounted platform, interoperability with the BFT-2 Satellite Network Control Center (SNCC) and Satellite Ground Station (SGS), and upgrade of the Waveform/Network Virtualization for the BFT network to support the new modular waveform and line of sight waveform. A Preliminary Design Review (PDR) and Critical Design Review (CDR) will also be conducted for the transceiver and encryption device development.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase to support development contracts and systems engineering efforts to continue BFT-3 transceiver and encryption device prototype development.</p>		10.396	9.475	17.384
<p><b>Title:</b> Test, Evaluation and Integration</p> <p><b>Description:</b> Plan and conduct system Integration test and experimentation events, in support of the BFT-3 development, to include Risk Reduction Events, vulnerability testing, and Army Interoperability Certification (AIC) testing.</p> <p><b>FY 2021 Plans:</b> Will conduct testing enhancements to the BFT/JBC-P network, to include third party component (transceiver) characterization, BFT modular waveform verification and validation, and validation of the Rapid Innovation Funding (RIF) deliverables.</p>		0.616	0.120	0.260

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Comm unications Systems - Eng Dev</i>	<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue to maintain and upgrade BFT network mitigation test lab (operational risk reduction of the currently fielded BFT 1 and BFT 2 network, to include the Satellite Network Control Center (SNCC), Satellite Ground Station (SGS)), and the updated modular waveform virtualization.  <b>FY 2022 Plans:</b> Funds support C5ISR lab based internal BFT-3 prototype testing to inform FY22 CDR. Will continue to conduct testing enhancements to the BFT/JBC-P network, to include third party component (transceiver) characterization, and validation, and validation of the initial BFT-3 transceiver and encryption device prototypes. Continue to maintain and upgrade BFT network mitigation test lab (operational risk reduction of the currently fielded BFT 1 and BFT 2 network, to include the Satellite Network Control Center (SNCC), Satellite Ground Station (SGS)), and the updated modular waveform virtualization.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase reflects cost to support C5ISR lab based internal BFT-3 prototype testing to inform FY22 CDR.				
<b>Title:</b> PM Support (Matrix & Contractor)  <b>Description:</b> JBC-P matrix and contractor support, including technical, logistics, and business staff oversight.  <b>FY 2021 Plans:</b> Will continue to provide technical (Satellite Communications (SATCOM), Network, Intel, RF, Cyber, Waveform, Transport) and business oversight for JBC-P architecture sustainment and system engineering activities. Program Management includes funds execution, contract management, and logistical support for the BFT-3 standards body (responsible for configuration management, and new technology insertion into the modular open systems architecture and the modular waveform).  <b>FY 2022 Plans:</b> Will fund matrix personnel to support to the development of the BFT-3 transceiver and encryption device prototypes, as well as continue to provide technical (SATCOM, Network, Intel, RF, Cyber, Waveform, Transport) and business oversight for JBC-P architecture sustainment and system engineering activities. Program Management includes funds execution, contract management, and logistical support for the BFT-3 standards body (responsible for configuration management, and new technology insertion into the modular open systems architecture, the modular waveform).  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase reflects matrix support needed as oversight for the development of new OTA construct.		1.065	1.079	2.477
<b>Accomplishments/Planned Programs Subtotals</b>		12.077	10.674	20.121



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Comm unications Systems - Eng Dev</i>	<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</i>
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	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
• W61990: JOINT BATTLE COMMAND - PLATFORM (JBC-P)	282.114	243.850	263.661	-	263.661	-	-	-	-	-	-

**Remarks**  
Procurement funding (Base funding) is designated for the procurement, fielding, and program management of JBC-P. JBC-P will complete procurement of its Army Acquisition Objective (AAO)/Basis of Issue (BOI) in FY24, and reach Full Operational Capability (FOC) in FY25.

**D. Acquisition Strategy**

The JBC-P Capabilities Development Document in lieu of Capabilities Production Document (CDD ILO CPD) was Joint Requirements Oversight Council (JROC) approved in March 2013. Initial Operational Test & Evaluation (IOT&E), as part of Network Integration Evaluation (NIE) 13.2, was completed in 3Q FY2013. The IOT&E tested the JBC-P system software on existing Force XXI Battle Command Brigade and Below (FBCB2) hardware (non-dismountable vehicle systems) and future production-representative hardware. On completion of Army Interoperability Certification (AIC) and Joint Interoperability Test Certification (JITC), Milestone Decision Authority (MDA) authorized Full Rate Production (FRP) in 1Q FY 2014. First unit equipped (FUE) was successfully conducted 3Q FY 2015.

Beginning in FY 2017, Systems Engineering development began for JBC-P's next generation Blue Force Tracking (BFT) Open Systems Architecture. Development was based on objective requirements in the JBC-P CDD ILO CPD until a follow-on requirements document is finalized. Developmental efforts are being performed through intra-government collaboration. System engineering efforts are being performed by C5ISR's Space and Terrestrial Communications Directorate (S&TCD); Command, Power and Integration (CP&I) and the Intelligence and Information Warfare Directorate (I2WD). Those efforts are intended to inform a BFT-3 full and open solicitation (Request for Prototype Proposal (RPP)) to industry in FY 2021.

Subsequent to RPP, FY 2022 funding will be placed on newly awarded contracts for prototype development of the BFT-3 standard transceiver and encryption device. FY 2022 performance testing on the BFT-3 transceiver and encryption device will validate preparation of initial FY 2023 prototype deliveries. Beginning in FY 2024, the development of the BFT-3 high resiliency and ground Aviation transceiver variants will begin. This transceiver will provide increased resiliency, leveraging emerging technology, though implementing an additional advanced beyond line of sight capability. RPP and Prototype awards are planned for FY 2024.

The follow-on effort for JBC-P is being established as the Mounted Mission Command (MMC) Family of Systems (FoS). MMC-Transport (MMC-T) is a part of the MMC FoS, and supports development of next generation Blue Force Tracking (BFT) hardware, specifically, the BFT-3 transceivers and encryption device, enhancing network performance and resiliency.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / Command, Control, Comm unications Systems - Eng Dev	<b>Project (Number/Name)</b> 593 / Joint Battle Command - Platform (JBC-P)
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<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
JBC-P Software Development	Various	Multiple : Multiple	67.463	-		-		-		-		-	Continuing	Continuing	-
JBC-P Software/System Engineering	Various	Multiple (Government and industry) : Multiple	58.930	10.396	Jan 2020	9.475	Nov 2020	17.384	Nov 2021	-		17.384	Continuing	Continuing	-
<b>Subtotal</b>			126.393	10.396		9.475		17.384		-		17.384	Continuing	Continuing	N/A

**Remarks**  
FY 2021 to FY 2022 increase to support development contracts and systems engineering efforts to continue BFT-3 transceiver and encryption device prototype development.

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PM Support (Matrix / SETA Contractor)	Various	PM JBC-P : Aberdeen Proving Ground (APG), MD	9.330	1.065	Dec 2019	1.079	Nov 2020	2.477	Nov 2021	-		2.477	Continuing	Continuing	-
<b>Subtotal</b>			9.330	1.065		1.079		2.477		-		2.477	Continuing	Continuing	N/A

**Remarks**  
FY 2021 to FY 2022 increase reflects matrix support needed as oversight for the development of new Other Transaction Authority (OTA) construct.

<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Develop and Conduct Tests and Assessments	MIPR	Multiple : Multiple	29.658	0.616	Jan 2020	0.120	Oct 2020	0.260	Oct 2021	-		0.260	Continuing	Continuing	-
<b>Subtotal</b>			29.658	0.616		0.120		0.260		-		0.260	Continuing	Continuing	N/A

**Remarks**  
FY 2021 to FY 2022 increase reflects cost to support C5ISR lab based internal BFT-3 prototype testing to inform FY22 Critical Design Review (CDR).



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / Command, Control, Comm unications Systems - Eng Dev	<b>Project (Number/Name)</b> 593 / Joint Battle Command - Platform (JBC-P)

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
BFT-3 Systems Engineering Development and Consurtium	CGDC/C5ISR Led With Industry Partners																											
RIF Unit Experimentation	FY20 - Developmental Operations (DevOps)																											
NetModX (Unit Experimentation)	DevOps Test Event																											
BFT-3 Developmental Testing (C5ISR Lab based)	Internal Waveform Testing to Further Inform BFT-3 Development Contract Awards																											
BFT-3 Transceiver Request for Prototype Proposal (RPP)	1 Standard Transceiver RPP																											
BFT-3 Encryption Device RPP	2 Encryption Device RPP																											
BFT-3 Resilient Line of Sight Contract Award	3 Resilient Line of Sight Contract Award (Prototype Development)																											
BFT-3 Transceiver & Encryption Device Contract Awards	4 Standard Transceiver & Encryption Device Contract Awards (Prototype Development)																											
BFT-3 Transceiver & Encryption Developmental Testing (C5ISR Lab based) 2	C5ISR Lab Based Testing To Further Inform Prototype Development																											
BFT-3 Transceiver & Encryption Device Design Review 1	5 Preliminary Design Review (PDR) for Standard Transceiver & Encryption Device																											
BFT-3 Line of Sight Waveform Delivery	6 Initial Delivery of Line of Sight Waveform																											
BFT-3 Soldier Touch Point (STP) 1	Planned DevOps Test Event (11th ACR)																											
BFT-3 Transceiver & Encryption Device Design Review 2	7 Critical Design Review (CDR) Standard Transceiver & Encryption Device																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Comm unications Systems - Eng Dev</i>	<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</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
BFT-3 Transceiver & Encryption Device Initial Deliveries													8															
BFT-3 Transceiver & Encryption Device Developmental Test (DT)																												
BFT-3 Soldier Touch Point (STP) 2																												
BFT-3 Encryption Device Certification																												
BFT-3 Soldier Touch Point (STP) 3																												
BFT-3 Deliveries (Limited Rate Initial Production (LRIP))																												
BFT-3 Transceiver & Encryption Device Initial Operational Test & Evaluation																												
BFT-3 Transceiver & Encryption Device Full Rate Production (FRP) Contract Award																												
BFT-3 Transceiver & Encryption Device Army Interoperability Certification (AIC)																												
BFT-3 Transceiver & Encryption Device First Unit Equipped (FUE)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Comm unications Systems - Eng Dev</i>	<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</i>

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
BFT-3 Systems Engineering Development and Consurtium	2	2017	4	2021
RIF Unit Experimentation	3	2020	4	2020
NetModX (Unit Experimentation)	3	2020	3	2020
BFT-3 Developmental Testing (C5ISR Lab based)	1	2021	4	2021
BFT-3 Transceiver Request for Prototype Proposal (RPP)	4	2021	4	2021
BFT-3 Encryption Device RPP	4	2021	4	2021
BFT-3 Resilient Line of Sight Contract Award	4	2021	4	2021
BFT-3 Transceiver & Encryption Device Contract Awards	1	2022	1	2022
BFT-3 Transceiver & Encryption Developmental Testing (C5ISR Lab based) 2	1	2022	4	2022
BFT-3 Transceiver & Encryption Device Design Review 1	2	2022	2	2022
BFT-3 Line of Sight Waveform Delivery	3	2022	3	2022
BFT-3 Soldier Touch Point (STP) 1	3	2022	3	2022
BFT-3 Transceiver & Encryption Device Design Review 2	3	2022	3	2022
BFT-3 Transceiver & Encryption Device Initial Deliveries	1	2023	1	2023
BFT-3 Transceiver & Encryption Device Developmental Test (DT)	2	2023	2	2023
BFT-3 Soldier Touch Point (STP) 2	2	2023	3	2023
BFT-3 Encryption Device Certification	1	2024	1	2024
BFT-3 Soldier Touch Point (STP) 3	1	2024	1	2024
BFT-3 Deliveries (Limited Rate Initial Production (LRIP))	4	2024	4	2024
BFT-3 Transceiver & Encryption Device Initial Operational Test & Evaluation	1	2025	1	2025
BFT-3 Transceiver & Encryption Device Full Rate Production (FRP) Contract Award	2	2025	2	2025
BFT-3 Transceiver & Encryption Device Army Interoperability Certification (AIC)	2	2025	3	2025

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604805A / <i>Command, Control, Communications Systems - Eng Dev</i>	<b>Project (Number/Name)</b> 593 / <i>Joint Battle Command - Platform (JBC-P)</i>		

Events	Start		End	
	Quarter	Year	Quarter	Year
BFT-3 Transceiver & Encryption Device First Unit Equipped (FUE)	4	2025	4	2025

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</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	-	70.489	51.285	44.424	-	44.424	-	-	-	-	-	-
812: <i>Mil HIV Vac&amp;Drug Dev</i>	-	1.152	1.184	-	-	-	-	-	-	-	-	-
832: <i>Field Medical Systems Engineering Development</i>	-	29.623	34.244	27.461	-	27.461	-	-	-	-	-	-
849: <i>Infec Dis Drug/Vacc Ed</i>	-	39.714	15.857	16.963	-	16.963	-	-	-	-	-	-

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

This Program Element (PE) funds advanced development of medical materiel within the System Demonstration and Low Rate Initial Production portions of the acquisition life cycle using Budget Activity 6.5 (System Development and Demonstration) funding. It supports products successfully developed in the Systems Integration portion of the Systems Development and Demonstration phases through completion of the Milestone C Decision Review. Commercially-off-the-shelf (COTS) medical products are also tested and evaluated for military use, when available. This PE primarily includes pivotal (conclusive) human clinical trials necessary for licensure by the Food and Drug Administration (FDA).

Projects in this PE include the following:

Project 812 funds military relevant human immunodeficiency virus (HIV) medical countermeasures. These funds provide for engineering and manufacturing development of candidate vaccines and drugs to permit large-scale field testing. Development focused on military unique needs effecting manning, mobilization, and deployment. Products from this project will normally transition to Department of Defense (DoD) Health Programs or Other Procurement, Army (OPA) Funds.

Project 832 funds the engineering and manufacturing development of medical products for enhanced combat casualty care and follow-on care, including rehabilitation. Mature COTS medical products are also evaluated for military use. Consideration will also be given to reduce the medical sustainment footprint through smaller weight and cube volume, or equipment independence from supporting materiel. Products from this project will normally transition to OPA Funds.

Project 849 funds development of candidate medical countermeasures for military relevant infectious diseases. These products fall in four major areas: vaccines, drugs, diagnostic kits/devices, and insect control measures to limit exposure and disease transmission. FDA approval is a mandatory obligation for all military products placed into the hands of medical providers or service members for human use. Products from this project will normally transition to DoD Health Programs or OPA funds.

These Projects are managed by United States (U.S.) Army Medical Materiel Development Activity (USAMMDA) and United States (U.S.) Army Medical Materiel Agency (USAMMA) of the U.S. Army Medical Research and Materiel Command.



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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>
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<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	48.264	49.870	46.860	-	46.860
Current President's Budget	70.489	51.285	44.424	-	44.424
Total Adjustments	22.225	1.415	-2.436	-	-2.436
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	23.952	-			
• SBIR/STTR Transfer	-1.727	-1.585			
• Adjustments to Budget Years	-	-	-2.436	-	-2.436

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 832: *Field Medical Systems Engineering Development*

Congressional Add: *Program increase - wearable medical device for TBI prevention*

	<b>FY 2020</b>	<b>FY 2021</b>
	-	3.000
Congressional Add Subtotals for Project: 832	-	3.000
Congressional Add Totals for all Projects	-	3.000

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 812 / <i>Mil HIV Vac&amp;Drug Dev</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
812: <i>Mil HIV Vac&amp;Drug Dev</i>	-	1.152	1.184	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Note**  
Funding realigned in Fiscal Year (FY) 2022 to Program Element (PE) 0604807A Project 849.

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

This Project funds militarily relevant human immunodeficiency virus (HIV) medical countermeasures. These funds provide for engineering and manufacturing development of candidate vaccines and drugs to permit large-scale field testing. Development is focused on militarily unique needs effecting manning, mobilization, and deployment.

The major contractor is The Henry M. Jackson Foundation for the Advancement of Military Medicine, Rockville, MD. Research efforts are coordinated with the National Institutes of Health.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Military HIV Vaccine and Drug Development	1.152	1.184	-
<b>Description:</b> This effort provides funds for engineering and manufacturing development of candidate vaccines and drugs to permit large-scale field testing of vaccines for medical countermeasures to HIV.			
<b>FY 2021 Plans:</b> Continue support to Global Vaccine Candidate clinical trial sites based on a Cooperative Research and Development Agreement (CRADA) with a commercial partner.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The decrease of funding in FY22 was due to realignment of this effort to PE 0604807A / Project 849.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.152	1.184	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

To support testing and evaluation of commercially developed vaccine candidates in government-managed trials.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev	<b>Project (Number/Name)</b> 812 / Mil HIV Vac&Drug Dev
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development Management Services Cost	Various	Various : Various	3.229	0.448		1.184		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			3.229	0.448		1.184		-		-		-	Continuing	Continuing	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development Cost	Various	Henry M. Jackson Foundation, : Various	33.967	-		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			33.967	-		-		-		-		-	Continuing	Continuing	N/A

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development Support Cost	Various	Various : Various	2.413	-		-		-		-		-	Continuing	Continuing	-
Regulatory Support	Option/Various	Clinical Research Management, Inc : Various	0.900	0.009		-		-		-		-	0.000	0.909	-
<b>Subtotal</b>			3.313	0.009		-		-		-		-	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development T&E Cost	Various	Various : Various	28.789	0.695		-		-		-		-	Continuing	Continuing	Continuing
<b>Subtotal</b>			28.789	0.695		-		-		-		-	Continuing	Continuing	N/A



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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>		<b>Project (Number/Name)</b> 812 / <i>Mil HIV Vac&amp;Drug Dev</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
Global HIV																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 812 / <i>Mil HIV Vac&amp;Drug Dev</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Global HIV	1	2021	4	2021

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev				<b>Project (Number/Name)</b> 832 / Field Medical Systems Engineering Development			
<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>
832: Field Medical Systems Engineering Development	-	29.623	34.244	27.461	-	27.461	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This Project funds the engineering and manufacturing development of medical products for enhanced combat casualty care and follow-on care, including rehabilitation. Mature commercial off the shelf (COTS) medical products are also evaluated for military use. Specifically funds pivotal (conclusive) human clinical trials or mechanical engineering evaluations for effectiveness of devices or biologics (products derived from living organisms) to fulfill unique military requirements. Consideration is also given to reducing the medical sustainment footprint through smaller weight and cube volume, or equipment independence from supporting materiel. This work is frequently completed through a laboratory/contractor team with the contractor obtaining the U.S. Food and Drug Administration (FDA) licensure for sale of the product.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Field Medical Systems Engineering Development PM Warfighter Deployed Medical Systems</p> <p><b>Description:</b> Funding is provided for modernization of Sets, Kits and Outfits.</p> <p><b>FY 2021 Plans:</b> Medical Equipment Sets COTS Modernization of Life Cycle Equipment: Will continue development and testing to ensure the most current and cost effective devices are being utilized. Equipment will be selected for modernization based on its own life cycle plan as part of a Sets, Kits and Outfits.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to internal restructure within PE 0604807A, Project 832.</p>	-	1.676	-
<p><b>Title:</b> Field Medical Systems Engineering Development PM Warfighter Protection and Acute Care</p> <p><b>Description:</b> Funding is provided for engineering and manufacturing development of medical products for enhanced combat casualty care and follow-on care, including blood products.</p> <p><b>FY 2021 Plans:</b> Cryopreserved Platelets: Will continue the new acquisition strategy that was developed and implemented in FY 2018 where a single commercial partner is utilized for the manufacturing development, clinical trials and regulatory processes thru licensure. Will continue non-clinical in-Vitro characterization and Phase 2 Clinical Trial efficacy study.</p>	11.357	14.430	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 832 / <i>Field Medical Systems Engineering Development</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Freeze-Dried Plasma Program: Will complete the Phase 2 safety and effectiveness study and prepare for of Phase 3 (expanded safety, effectiveness and dosing) pivotal study. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to internal restructure within PE 0604807A, Project 832.				
<b>Title:</b> Field Medical Systems Engineering Development PM Warfighter Health, Performance and Evacuation (formerly PM Medical Support Systems)  <b>Description:</b> This project funds the engineering and manufacturing development of medical products for prevention of injury, enhanced combat casualty care, and evacuation.  <b>FY 2021 Plans:</b> Modernization of medical equipment sets: Will complete modernization and evaluation of the Field Hospital water distribution and waste water management system and blood transport products. Will continue evaluation of other commercial items for medical equipment sets.  Airworthiness Testing: Will conduct airworthiness testing, required by AR 70-62, for Medical Equipment Set and Mission Essential Package with products covering air evacuation.  Medical Evac and Treatment Vehicles Medical Equipment Set and Mission Essential Package and CASEVAC: Will complete design and evaluation of the CASEVAC system for the JLTV  Soldier Optimization Decision Aids (SODA): Will coordinate with PEO Soldier to transition the Mental Acuity, Environmental Exposure Electronic (E3) form (formerly Environment Health Assessment and Risk Management (EHARM) tool) and the Cold Weather Ensemble Decision Aid.  Next Generation Uniform Repellent/Impregnation: Will complete project and transition to PEO Soldier.  Litter Transport Shock/Stressor Mitigation System (Formerly: Next Generation Immobilization System): Project concluded in FY 2018 with transition to the Air Force.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to internal restructure within PE 0604807A, Project 832.		6.262	4.621	-
<b>Title:</b> Field Medical Systems Engineering Development - PM Warfighter Brain Health		12.004	10.517	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 832 / <i>Field Medical Systems Engineering Development</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> This effort funds systems engineering development of medical products for enhanced combat casualty care for diagnosis of Traumatic Brain Injury (TBI).</p> <p><b>FY 2021 Plans:</b> Laboratory Assay for TBI - Point of Care (formerly TBI Diagnostic Assay System): Will continue validation studies for testing of a blood assay to aid in the diagnosis of TBI. Will finalize FDA submission of the assay for Food and Drug Administration approval. Will finalize data analysis and report on the assay's ability to predict recovery from TBI.</p> <p>Non-invasive neuro assessment device (NINAD): Moved to WBH due to PMO Reorganization. Will initiate developmental testing and initial operational assessments based on FDA approval and maturity of other commercially available products.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to internal restructure within PE 0604807A, Project 832.</p>				
<p><b>Title:</b> Field Medical Systems Engineering Development - Medical Readiness</p> <p><b>Description:</b> Funding is provided for engineering and manufacturing development of medical products for diagnostic devices and testing of medical devices for use in the field.</p> <p><b>FY 2022 Plans:</b> Laboratory Assay for Traumatic Brain Injury (TBI) - Point of Care: Will complete validation studies for testing of a blood assay to aid in the diagnosis of TBI. Medical Device Testing (formerly Modernization of medical equipment sets): Will continue to conduct test and evaluation of commercial items for medical equipment sets as required by AR 73-1 and DoD 5000. Airworthiness Testing: Will continue to conduct airworthiness testing, required by AR 70-62, for Medical Equipment Set and Mission Essential Package with products.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to internal restructure within PE 0604807A, Project 832.</p>		-	-	11.621
<p><b>Title:</b> Field Medical Systems Engineering Development - Battlefield Care and Return to Fight</p> <p><b>FY 2022 Plans:</b> Handheld Ultrasound: Will conduct testing and evaluation of prototype devices. This will inform the selection of a device that meets Army requirements. Extremity Injury Repair - Vascular: Will complete FDA clinical studies and submit application to FDA for approval. Will also conduct stability testing for operational environment.</p>		-	-	15.840

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 832 / <i>Field Medical Systems Engineering Development</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
<p>Cryopreserved Platelets: Will continue non-clinical in-Vitro characterization and Phase 2 Clinical Trial efficacy study.</p> <p>Freeze-Dried Plasma Program: Due to an unexpected delay in phase 2 safety and effectiveness study initiation, will complete Phase 2 safety and effectiveness study originally scheduled for completion in FY21. Will prepare for initiation of Phase 3 (expanded safety, effectiveness and dosing) pivotal study.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to internal restructure within PE 0604807A, Project 832.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	29.623	31.244	27.461

	FY 2020	FY 2021
<b>Congressional Add:</b> Program increase - wearable medical device for TBI prevention	-	3.000
<b>FY 2021 Plans:</b> Will commit resources to validate requirements & award a competitive contact to mature a wearable TBI medical device system that will protect service members from TBI injury in austere joint, all-domain operations		
<b>Congressional Adds Subtotals</b>	-	3.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

To support developing in-house or industrial prototypes in government-managed programs to meet military and regulatory requirements for production and fielding.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev	<b>Project (Number/Name)</b> 832 / Field Medical Systems Engineering Development
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development Management Services Cost	Various	Various : Various	45.245	8.407		6.336		2.850		-		2.850	Continuing	Continuing	Continuing
Medical Product Development Management Services Cost	PO	General Dynamics Information Technology : Frederick MD	-	0.752		0.300		0.300		-		0.300	0.000	1.352	-
<b>Subtotal</b>			45.245	9.159		6.636		3.150		-		3.150	Continuing	Continuing	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development Cost	Various	Various : Various	10.928	-		-		0.691		-		0.691	Continuing	Continuing	Continuing
Cryopreserved Platelets	Various	TBD : TBD	1.875	5.236		4.127		3.534		-		3.534	0.000	14.772	-
Laboratory Assay for Traumatic Brain Injury	C/Various	Abbott Laboratories : Chicago, IL	13.211	8.432		7.271		-		-		-	Continuing	Continuing	Continuing
Laboratory Assay for Traumatic Brain Injury	TBD	Abbot Laboratories : Chicago, Ill	-	-		-		6.680		-		6.680	0.000	6.680	-
Handheld Ultrasound	Various	TBD : TBD	-	-		-		1.461		-		1.461	Continuing	Continuing	Continuing
Extremity Injury Repair - Vascular	TBD	Humacyte : Morrisville, NC	-	-		-		2.656		-		2.656	0.000	2.656	-
Freeze Dried Plasma	C/FFP	Vascular Solutions : Maple Grove, MN	-	1.174		-		-		-		-	0.000	1.174	-
Program increase - wearable medical device for TBI prevention	TBD	TBD : TBD	-	-		3.000		-		-		-	0.000	3.000	-
<b>Subtotal</b>			26.014	14.842		14.398		15.022		-		15.022	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev				832 / Field Medical Systems Engineering Development							
Support (\$ in Millions)				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
Regulatory Support	Various	Clinical Research Management, Inc., : Various	8.760	0.309		-		-		-		-	Continuing	Continuing	Continuing
Medical Product Development Support Cost	Various	Various : Various	11.729	1.948		0.730		-		-		-	Continuing	Continuing	Continuing
Medical Equipment Sets Development	Various	Various : Various	2.670	-		1.310		-		-		-	0.000	3.980	-
Airworthiness Certification	TBD	Various : Various	-	1.374		-		1.823		-		1.823	0.000	3.197	-
Soldier Optimization Decision Aid	TBD	Various : Various	-	1.000		-		-		-		-	0.000	1.000	-
<b>Subtotal</b>			23.159	4.631		2.040		1.823		-		1.823	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
Medical Product Development T&E Cost	Various	Various : Various	18.291	-		0.500		-		-		-	Continuing	Continuing	Continuing
Cryopreserved Platelets	C/CPFF	Cellphire : Rockville, MD	17.996	-		4.105		1.246		-		1.246	0.000	23.347	-
Medical Equipment Sets Development	Various	Various : Various	5.014	0.691		1.456		-		-		-	0.000	7.161	-
Freeze Dried Plasma	C/CPFF	Westat : Rockville, MD	14.691	0.300		5.109		6.220		-		6.220	0.000	26.320	-
<b>Subtotal</b>			55.992	0.991		11.170		7.466		-		7.466	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			150.410	29.623		34.244		27.461		-		27.461	Continuing	Continuing	N/A
<b>Remarks</b>															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 832 / <i>Field Medical Systems Engineering Development</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
Cryopreserved Platelets (CPP) Phase 2 efficacy clinical studies	Phase 2																											
Cryopreserved Platelets (CPP) Phase III clinical studies	Phase 3																											
Freeze-dried Plasma (FDP) Phase I safety clinical studies	Phase I																											
Freeze-dried Plasma (FDP) Phase 2 efficacy clinical studies	Phase 2																											
Laboratory Assay for TBI Point of Care Device Clinical Trial	Clinical Trial																											
Laboratory Assay for TBI Point of Care Device MS C	MS-C																											
Extremity Injury Repair - Vascular- Pivotal Study	Vascular- Pivotal Study																											
Extremity Injury Repair - Vascular- Environmental Testing/Operational Testing	Vascular- Environmental Testing/Operational Testing																											
Handheld Ultrasound - RMF Ruggedization, LRIP, and IOT&E	RMF Ruggedization, LRIP, and IOT&E																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 832 / <i>Field Medical Systems Engineering Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Cryopreserved Platelets (CPP) Phase 2 efficacy clinical studies	3	2017	4	2024
Cryopreserved Platelets (CPP) Phase III clinical studies	4	2021	3	2023
Freeze-dried Plasma (FDP) Phase I safety clinical studies	3	2014	2	2021
Freeze-dried Plasma (FDP) Phase 2 efficacy clinical studies	2	2016	1	2023
Laboratory Assay for TBI Point of Care Device Clinical Trial	1	2021	4	2022
Laboratory Assay for TBI Point of Care Device MS C	2	2021	2	2021
Extremity Injury Repair - Vascular- Pivotal Study	1	2019	1	2023
Extremity Injury Repair - Vascular- Environmental Testing/Operational Testing	1	2022	4	2023
Handheld Ultrasound - RMF Ruggedization, LRIP, and IOT&E	1	2022	4	2024

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev	<b>Project (Number/Name)</b> 849 / Infec Dis Drug/Vacc Ed
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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
849: <i>Infec Dis Drug/Vacc Ed</i>	-	39.714	15.857	16.963	-	16.963	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

This Project funds development of candidate medical countermeasures (MCM: e.g., vaccines, drugs, diagnostic kits/devices) for militarily relevant infectious diseases. It funds research that supports conclusive human clinical trials to demonstrate MCM effectiveness safety and related manufacturing tests. This work, which is jointly performed by military laboratories, civilian contracted pharmaceutical firms and foreign research partners, is directed toward the prevention of disease, early diagnosis, and speeding recovery once diagnosed. Medical products approved for human use must meet the United States (U.S.) Food and Drug Administration (FDA) approval before MCM can be used on Warfighters. Development priority is based upon four major factors: (1) the extent of the disease within the Combatant Commands' theater of operations, (2) the clinical severity of the disease, (3) the technical maturity of the proposed solution, and (4) the affordability of the solution (development, production, and sustainment). Malaria, dysentery and dengue diseases (a severe debilitating disease transmitted by mosquitoes), which are found in all Combatant Command areas and are at the top of the infectious diseases risks list.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Infectious Disease Drug and Vaccine Engineering Development</p> <p><b>Description:</b> Funding for research and development efforts for drugs and vaccines for infectious diseases that are top threats to deployed US forces. Funds research that supports conclusive human clinical trials to demonstrate effectiveness, safety and related manufacturing tests.</p> <p><b>FY 2021 Plans:</b> Dengue Vaccine Effort: Will continue to fund support for Advance Development (AD) candidate vaccine for the expanded FDA safety/effectiveness/dosing study in humans.</p> <p>Malaria Prophylactic Drug ? Tafenoquine (TQ) (Formerly Next Generation Malaria Prophylaxis): Achieved MS C in FY19. Will address any remaining FDA post-marketing approval requirements.</p> <p>Topical Antileishmanial Cream (TLC, Paromomycin/Gentamicin): Project terminated in FY 2019.</p> <p>Rapid Diagnostic and Detection Devices: The dengue and chikungunya assays will continue to be developed and evaluated. Clinical testing for dengue will continue.</p>	15.297	15.857	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 849 / <i>Infec Dis Drug/Vacc Ed</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Tick-Bourne Encephalitis Vaccine (TBEVV): Develop Pfizer's European Medicines Agency approved TBEVV for FDA licensure following commercial partner agreement.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to internal restructure within PE 0604807A, Project 849.</p>				
<p><b>Title:</b> Infectious Disease Drug and Vaccine Engineering Development - Medical Readiness</p> <p><b>Description:</b> Funding is provided for the development of candidate medical countermeasures for military relevant infectious diseases focusing on prevention to increase medical readiness. Funding supports both technical evaluations and human clinical testing to assure the safety and effectiveness of vaccines.</p> <p><b>FY 2022 Plans:</b> Dengue Vaccine Effort: Fund post licensure activities required by the FDA for use of the vaccine in military populations. Malaria Chemoprophylaxis -Tafenoquine (formerly Next Generation Malaria Prophylaxis): Will continue to address any remaining FDA post-marketing requirements. Tick-Bourne Encephalitis Vaccine (TBEVV): Industry Developer will pursue FDA approval on it's own. Human Immunodeficiency Virus Vaccine (HIVV): Program and funding moved from Project 0603807A 811 and Project 643807A 812. Will continue to support clinical trial sites based on a Cooperative Research and Development Agreement (CRADA) with a commercial partner.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to internal restructure within PE 0604807A, Project 849.</p>		-	-	12.720
<p><b>Title:</b> Infectious Disease Drug and Vaccine Engineering Development - Battlefield Care and Return to Fight</p> <p><b>Description:</b> Funding for research and development efforts for drugs for treatment and devices for early diagnosis for infectious diseases that are top threats to deployed US forces. Funds research that supports conclusive human clinical trials to demonstrate effectiveness, safety and related manufacturing tests</p> <p><b>FY 2022 Plans:</b> Rapid Diagnostic and Detection Devices (Infectious Disease Diagnostics (Multiple): Begin planning Phase III clinical trials and final manufacturing development of the Tropical Disease and Flu and Viral Infection Diseases (FLU-VID) diagnostic panels for a man-portable device.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to internal restructure within PE 0604807A, Project 849.</p>		-	-	4.243
<b>Title:</b> Infectious Disease Drug and Vaccine Engineering Development - CARES ACT		24.417	-	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 849 / <i>Infec Dis Drug/Vacc Ed</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Accomplishments/Planned Programs Subtotals</b>	39.714	15.857	16.963

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

N/A

**Remarks**

**D. Acquisition Strategy**

To support testing and evaluation of in-house and commercially developed products in government-managed trials to meet FDA requirements.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev				849 / Infec Dis Drug/Vacc Ed							
Management Services (\$ in Millions)				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
Medical Product Development Management Services Cost	Various	Various : Various	25.359	3.590		0.500		0.500		-		0.500	Continuing	Continuing	Continuing
Medical Product Development Management Services Cost	C/CPFF	General Dynamics Information Technology : Frederick MD	12.471	1.871		1.500		1.984		-		1.984	0.000	17.826	-
<b>Subtotal</b>			37.830	5.461		2.000		2.484		-		2.484	Continuing	Continuing	N/A
Product Development (\$ in Millions)				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
Medical Product Development Cost	Various	Various : Various	39.557	2.439		-		-		-		-	Continuing	Continuing	Continuing
Dengue Tetravalent Vaccine	TBD	TBD : TBD	2.047	-		-		-		-		-	0.000	2.047	-
Rapid Diagnostic and Detection Devices	Various	Inbios, Inc : Seattle WA	-	3.443		3.673		3.700		-		3.700	0.000	10.816	-
CARES ACT	TBD	TBD : TBD	-	24.417		-		-		-		-	0.000	24.417	-
<b>Subtotal</b>			41.604	30.299		3.673		3.700		-		3.700	Continuing	Continuing	N/A
Support (\$ in Millions)				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
Medical Product Development Support Cost	Various	Various : Various	19.392	-		-		-		-		-	Continuing	Continuing	Continuing
Medical Product Development Support Cost	PO	Clinical Research Management, In : Hinckley, OH	6.438	0.166		-		-		-		-	0.000	6.604	-
<b>Subtotal</b>			25.830	0.166		-		-		-		-	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev	<b>Project (Number/Name)</b> 849 / Infec Dis Drug/Vacc Ed
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<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Medical Product Development T&E Cost	Various	Various : Various	51.320	-		-		-		-		-	Continuing	Continuing	Continuing
Dengue Tetravalent Vaccine	TBD	WRAIR/AFRIMS : Silver Spring MD	1.788	0.861		0.390		0.861		-		0.861	0.000	3.900	-
Dengue Tetravalent Vaccine	C/TBD	BioPath : Philippines	5.974	0.770		0.750		1.017		-		1.017	0.000	8.511	-
Product Development of Dengue Tetravalent Vaccine	Various	TBD : TBD	4.530	-		-		-		-		-	0.000	4.530	-
Next Generation Malaria Prophylaxis	Various	DVC : Frederick MD	3.228	2.157		2.729		3.695		-		3.695	0.000	11.809	-
Tick-Borne Encephalitis Vaccine	Various	TBD : TBD	-	-		4.238		-		-		-	0.000	4.238	-
Norovirus Vaccine	Various	TBD : TBD	-	-		2.077		-		-		-	0.000	2.077	-
Human Immunodeficiency Virus Vaccine (HIVV)	Various	Janssen Vaccines & Prevention B.V. : Netherlands	-	-		-		3.544		-		3.544	0.000	3.544	-
Human Immunodeficiency Virus Vaccine (HIVV)	TBD	PPD : Wilmington, NC	-	-		-		1.662		-		1.662	0.000	1.662	-
<b>Subtotal</b>			66.840	3.788		10.184		10.779		-		10.779	Continuing	Continuing	N/A

	<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>						
<b>Project Cost Totals</b>											172.104	39.714	15.857	16.963	-	16.963	Continuing	Continuing	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / Medical Materiel/Medical Biological Defense Equipment - Eng Dev	<b>Project (Number/Name)</b> 849 / Infec Dis Drug/Vacc Ed

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
Dengue Tetravalent Vaccine (DTV) Phase 3 Pivotal Clinical Trial	[Redacted]				[Redacted]																							
Dengue Tetravalent Vaccine (MS-C)					 MS-C																							
Dengue Tetravalent Vaccine EMD					[Redacted]																							
Rapid Human Diagnostic Devices	[Redacted]																											
Malaria Prophylaxis Post FDA Approval Marketing Studies	[Redacted]																											
Global HIV Phase 2B Clinical Trial									[Redacted]																			
Global HIV Phase 3 Efficacy Clinical Trial													[Redacted]															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604807A / <i>Medical Materiel/Medical Biological Defense Equipment - Eng Dev</i>	<b>Project (Number/Name)</b> 849 / <i>Infec Dis Drug/Vacc Ed</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Dengue Tetravalent Vaccine (DTV) Phase 3 Pivotal Clinical Trials	1	2012	2	2020
Dengue Tetravalent Vaccine (MS-C)	2	2021	2	2021
Dengue Tetravalent Vaccine EMD	3	2020	4	2022
Rapid Human Diagnostic Devices	1	2020	4	2025
Malaria Prophylaxis Post FDA Approval Marketing Studies	4	2019	4	2023
Global HIV Phase 2B Clinical Trial	1	2022	1	2023
Global HIV Phase 3 Efficacy Clinical Trial	1	2023	1	2026

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</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	-	33.881	9.239	14.137	-	14.137	-	-	-	-	-	-
016: <i>Close Combat Capabilities ENG DEV</i>	-	18.408	7.314	11.174	-	11.174	-	-	-	-	-	-
415: <i>Mine Neutral/Detection</i>	-	15.473	1.925	-	-	-	-	-	-	-	-	-
CS2: <i>Render Safe Sets Kits and Outfits (RS-SKO)</i>	-	-	-	0.916	-	0.916	-	-	-	-	-	-
CS3: <i>Next Generation Advanced Bomb Suit (NGABS)</i>	-	-	-	2.047	-	2.047	-	-	-	-	-	-

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

This Program Element (PE) provides for the Engineering and Manufacturing Development (EMD) and demonstration of networked munitions, countermine systems, Explosive Ordnance Disposal (EOD) render safe, and counter improvised explosive device capabilities. This PE also implements the National Landmine Policy to develop alternatives to the non-self-destructing counter mobility anti-personnel landmine systems. The PE contributes to area access and area denial (A2/AD) to support unified land operations and improve soldier survivability.

Project 016: Funding in this program supports the Army's Cross Functional Teams (CFT) initiatives. Project 016, Close Combat Capabilities, covers two programs: Next Generation Advanced Bomb Suit (NGABS) and Explosive Ordnance Disposal Render Safe (EOD RS). It provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. NGABS directly contributes to Soldier lethality and ground force commander freedom of maneuver by providing next generation sensor and optics in the cutting-edge Heads-Up-Display (HUD) while integrating the Government's latest investments in protective material for the modular, scalable NGABS bomb suit fabrication. EOD RS equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to improve commonality.

NGABS will increase the Warfighter lethality and mobility by optimizing Soldier protection for EOD personnel, while effectively managing all life cycle aspects of Personal Protective Equipment (PPE). Warfighter lethality is increased through bomb suit weight reduction utilizing extensive investments in protective material research and development. The result is material solutions that are lighter and are pieced together in a manner which increases Soldier mobility and longevity. EOD Soldier situational awareness and exposure to ballistic threats is enhanced through the NGABS HUD which allows the Soldier increased visibility under various obscurants and low/no-light situations.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	
<p>Project 415: This Project provides for Engineering Manufacturing and Development (EMD) for the next generation of capabilities to detect, identify and neutralize hybrid threats and explosive hazards such as Improvised Explosive Devices (IEDs) and landmines. These capabilities are a Family of Systems (FOS) encompassing handheld, vehicle mounted, small robotic mounted, aerial platform mounted and area access, and neutralization systems operating in manned, remotely controlled, semi-autonomous or fully autonomous modes. Continued development of this FOS is necessary to support Route Clearance Platoons located within both Engineer Companies and Brigade Engineering Battalion Brigade Combat Teams.</p> <p>The Husky Mounted Detection System (HMDS) is a counter-explosive device capability that provides standoff detection and marking of metallic encased caches and metallic and low-metallic antitank landmines, unexploded ordnance, trigger mechanisms, and improvised explosive devices (IEDs) in support of route and area-clearance operations. HMDS is a mission equipment package mounted on the Husky route clearance vehicle. The program was restructured in September 2016 to align with emerging shallow buried Wire Detection (WD) capabilities integrated onto the HMDS Increment A1 configuration (includes Ground Penetrating Radar (GPR)). These changes are necessary to adapt to changing IED threats. WD Technology will be fully integrated through Engineering Change Proposals (ECPs) at the end of FY20. Prototypes developed under the concluded HMDS Increment A2 effort may be leveraged in development of future capabilities. Future capabilities may include detection of deep buried IEDs and caches, and semi-autonomous control of the Husky vehicle and HMDS from inside a follow-on vehicle.</p> <p>Route Clearance &amp; Interrogation System (RCIS) Type I consists of a semi-autonomous vehicle and includes designated control vehicles and Operator Control Units (OCUs) which provide a standoff capability to detect and neutralize the full spectrum of explosive hazards. Type I integrates a semi-autonomous kit onto a High Mobility Engineering Excavator (HMEE) for remote control from a Buffalo Mine Protected Clearance Vehicle (MPCV). RCIS Type I semi-autonomous kit will be integrated onto the HMEE and be capable of interrogating and classifying explosive hazards. An OCU will be integrated into a Buffalo MPCV for Type I. RCIS capabilities will be fielded to Route Clearance Squads and Engineer Platoons which includes Tele-operation, RADAR-based Follow-Me, LIDAR obstacle detection, onscreen predictive turning map, and customizable camera views in order to achieve the RCIS mission.</p> <p>Standoff Robotic Explosive Hazard Detection System (SREHD), formerly known as the Autonomous Mine Detection System (AMDS), provides increased survivability through mine and explosive hazards stand-off detection, marking and neutralization capability for the dismounted soldier. It provides area access and freedom of movement for the Commander. SREHD consists of payload modules to be mounted on man-portable unmanned ground vehicles. The payloads are for surface laid and buried threats to include mines and explosive hazards. This capability allows a soldier to remain in a protective posture while detecting and neutralizing a wide variety of hybrid and conventional explosive threats. SREHD conducted a successful Milestone (MS) C in April 2018 and initiated Low Rate Initial Production (LRIP) in June 2018. Due to the realignment of funds FY 2020-2024 to higher Army priorities, the proponent withdrew support to the Standoff Robotic Explosive Hazard Detection System (SREHD) after Low Rate Initial Production (LRIP) award. Research, Development, Test and Evaluation (RDTE) tasks will conclude in FY 2019 under FY 2018 PE 0654808A, Project 415, Landmine Warfare/Barrier - Eng Dev, once corrective action plans and trainer re-development are completed. The program will conclude in June 2020 under FY 2018 OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) and PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335 for system qualification and production and receipt of LRIP quantities for an orderly program closeout.</p> <p>Robotic Explosive Hazard Detection System (REHDS) provides the warfighter with a robotic mounted capability to detect and mark buried landmines and IEDs from a safe standoff distance. REHDS is an enabler for Soldier Lethality as it enables soldier maneuverability by enhancing the probability and speed of detection of buried landmines and IEDs allowing for increased speed of dismounted operations making the unit more efficient and lethal. REHDS is a new start in FY 2021 and begins</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>
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in the Engineering and Manufacturing Development (EMD) phase. REHDS will leverage developed SREHD capability and incorporate increased Rate of Advanced Downtrack (RoAD) and Integration to the Man Transportable Robotic System (MTRS) II platform.

Project CS2: This project provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. EOD Render Safe Sets Kits and Outfits (RS-SKO) equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to improve commonality.

<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	37.108	9.589	9.226	-	9.226
Current President's Budget	33.881	9.239	14.137	-	14.137
Total Adjustments	-3.227	-0.350	4.911	-	4.911
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.700	-			
• SBIR/STTR Transfer	-1.527	-0.350			
• Adjustments to Budget Years	-	-	4.911	-	4.911

**Change Summary Explanation**

The FY 2021 to FY 2022 increase supports integrating prototype efforts to support force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon systems. This includes responding to impending Army requirements. Funding includes supporting capability and capacity to meet Army strategic guidance in support of the National Defense Strategy, and other related Army efforts.



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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev				<b>Project (Number/Name)</b> 016 / Close Combat Capabilities ENG DEV			
<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>
016: Close Combat Capabilities ENG DEV	-	18.408	7.314	11.174	-	11.174	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project 016: Funding in this program supports the Army's Cross Functional Teams (CFT) initiatives. Project 016, Close Combat Capabilities, covers two programs: Next Generation Advanced Bomb Suit (NGABS) and Explosive Ordnance Disposal Render Safe (EOD RS).

NGABS directly contributes to Soldier lethality and ground force commander freedom of maneuver by providing next generation sensor and optics in the cutting-edge Heads-Up-Display (HUD) while integrating the Government's latest investments in protective material for the modular, scalable NGABS bomb suit development. NGABS will increase the Warfighter survivability and mobility by optimizing Soldier protection for EOD personnel, while effectively managing all life cycle aspects of Personal Protective Equipment (PPE). Warfighter lethality is increased through bomb suit weight reduction utilizing extensive investments in protective material research and development. The result is material solutions that are lighter and are pieced together in a manner which increases Soldier mobility and longevity. EOD Soldier situational awareness and exposure to ballistic threats is enhanced through the NGABS HUD which allows the Soldier increased visibility under various obscurants and low/no-light situations. Funds were transferred from APE 0604808016 to APE 0604808CS3 to clearly define the functions that are being completed with the NGABS funding line.

Explosive Ordnance Disposal Render Safe (EOD RS) provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. EOD RS equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to increase commonality.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Next Generation Advanced Bomb Suit (NGABS)	11.186	6.351	0.166
<b>Description:</b> The objective of this effort is to increase the Warfighter lethality, modularity, and mobility, by optimizing Soldier protection and situational awareness for EOD personnel. The mission of this program is to enhance the tactical utility and applicability of this bomb suit concept by incorporating modularity/scalability and sensor technologies that are non-existent in legacy designs. This new, tailorable, full body protective system will provide a significantly increased capability at a reduced weight.			
<b>FY 2021 Plans:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 016 / Close Combat Capabilities ENG DEV

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>NGABS FY 2021 plans center around finalizing the production design for the bomb suit, executing ballistic and blast test plans with subsequent fixes applied to the suit design. FY 2021 also leads NGABS into the complex phases of component integration; sensor suite, Heads Up Display (HUD), power, cooling, helmet, and suit with Soldier Protection System components. All of these components combined are the NGABS system. FY 2021 includes the planning and scheduling for system level tests (ballistic, blast, environmental, Human Factor Evaluation (HFE), etc.).</p> <p><b>FY 2022 Plans:</b> Funds were transferred from APE 0604808016 to APE 0604808CS3 to clearly define the functions that are being completed with the NGABS funding line.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funds were transferred from APE 0604808016 to APE 0604808CS3 to clearly define the functions that are being completed with the NGABS funding line.</p>			
<p><b>Title:</b> Explosive Ordnance Disposal (EOD) Render Safe (RS)</p> <p><b>Description:</b> Render Safe (RS) procedures require technicians to employ a wide variety of capabilities and explosives.</p> <p><b>FY 2021 Plans:</b> Activities include the conduct of a market survey, testing of equipment against requirements, reporting of findings and recommendations. Electronic countermeasures (ECM) continue to be tested and evaluated against emerging threats and loadset verification and validation will continue. Conduct preliminary design reviews for ECM and contract award for prototype systems.</p> <p><b>FY 2022 Plans:</b> FY 2022 funding will support the build of the final ECM design prototypes and the testing of the final prototypes against requirements.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2021 funding required to support multiple prototype design builds ahead of a down select and final design build in FY 2022. Program is transitioning to project CS2:Render Safe Sets Kits and Outfits (RS-SKO) in FY 2022.</p>	7.222	0.963	0.074
<p><b>Title:</b> Prototype Integration for Multi-Domain Operations</p> <p><b>Description:</b> Integrating prototype efforts to support force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon system including responding to impending Army requirements. Effort will support capability and capacity to meet Army strategic guidance in support of the National Defense Strategy and other related Army efforts.</p> <p><b>FY 2022 Plans:</b></p>	-	-	10.934

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> 016 / <i>Close Combat Capabilities ENG DEV</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2022 funding in the amount of \$10.934 million will support integrating prototype efforts to support force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon systems. This effort supports the Secretariat and Global Security Initiatives in identified Army Research, Development, Test and Evaluation (RDTE) requirements to ensure capability, capacity and readiness of Army Military capabilities. Includes next generation devices and technologies to support Army's ability to meet current and emerging requirements, integrating RDTE prototypes with Component programs for acquisition, sustainment and maintenance. Funding includes supporting capability and capacity to meet Army strategic guidance in support of the National Defense Strategy, and other related Army efforts.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY 2021 to FY2022 funding increase to support force protection and signature management related to critical mission multi-domain operations and key weapon systems to meet Army strategic guidance in support of the National Defense Strategy.			
<b>Accomplishments/Planned Programs Subtotals</b>	18.408	7.314	11.174

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• R63610: <i>Render Safe Sets kits Outfits</i>	102.684	145.313	84.000	-	84.000	-	-	-	-	-	-
• CS2: <i>Render Safe Sets Kits and Outfits (RS-SKO)</i>	-	-	0.916	-	0.916	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
The Next Generation Advanced Bomb Suit (NGABS) Program utilizes a competitive, developmental, innovative and efficient Other Transaction Authority (OTA) in EMD through the Fort Belvoir Sensor Communication and Electronic Consortium (SCEC) which will result in a production ready prototype leading to a Production and Deployment (PD) phase for full capability while ensuring best value to the Army. Milestone (MS) B / Material Development Decision (MDD) occurred in FY 2018 and MS C is scheduled for FY 2022.

The Explosive Ordnance Disposal (EOD) Render Safe (RS) program utilizes existing government contract vehicles to acquire prototype systems for testing and evaluation of the systems for down selection and inclusion in the capabilities package during Engineering and Manufacturing Development. The program will continue to use the existing government contract vehicles for the production and deployment phase as well as to continue the development of capabilities during the 5 phase technical refresh.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> 016 / <i>Close Combat Capabilities ENG DEV</i>

The Multi-Domain Operations (MDO) program utilizes existing government contract vehicles to integrate prototype efforts to support force protection and signature management related to critical mission threads, operational constructs and key weapons systems.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604808A / Landmine Warfare/Barrier - Eng Dev				016 / Close Combat Capabilities ENG DEV								
<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	
NGABS	Allot	PM SPE : Fort Belvoir	1.801	0.703		0.900		-		-		-	0.000	3.404	Continuing	
<b>Subtotal</b>			1.801	0.703		0.900		-		-		-	0.000	3.404	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	
NGABS - Production Prototype Development	C/FFP	TBD : Manufacturing Techniques Inc. (MTEQ), Lorton, VA	11.791	2.153		2.899		-		-		-	0.000	16.843	Continuing	
EOD RS Development Contract 1	MIPR	Northrop Grumman Corporation : Falls Church, VA	-	2.000	Sep 2020	-		-		-		-	0.000	2.000	Continuing	
EOD RS Development Contract 2	MIPR	Sierra Nevada Corporation : Sparks, NV	-	2.000	Sep 2020	-		-		-		-	0.000	2.000	Continuing	
EOD RS Development Contract 3	MIPR	Peraton Corporation : Herndon, VA	-	1.921	Dec 2020	-		-		-		-	0.000	1.921	Continuing	
EOD RS Follow On Development Contract	MIPR	TBD : TBD	-	-		0.129	Aug 2021	-		-		-	0.000	0.129	Continuing	
Prototype Integration for Multi-Domain Operations	TBD	TBD : TBD	-	-		-		10.934	Jan 2022	-		10.934	0.000	10.934	Continuing	
<b>Subtotal</b>			11.791	8.074		3.028		10.934		-		10.934	0.000	33.827	N/A	
<b>Support (\$ 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	
NGABS Support Costs	MIPR	TBD : Various	1.711	0.703		2.126		0.166		-		0.166	0.000	4.706	Continuing	

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 016 / Close Combat Capabilities ENG DEV
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<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			
EOD RS	MIPR	DEVCOM C5ISR Center : Aberdeen Proving Ground (APG), MD	-	0.959	Jan 2020	0.687	Mar 2021	-		-		-	0.000	1.646	Continuing
EOD RS	MIPR	DEVCOM Armaments Center : Plcatinny Arsenal, NJ	-	-		-		0.074	Oct 2021	-		0.074	0.000	0.074	Continuing
<b>Subtotal</b>			1.711	1.662		2.813		0.240		-		0.240	0.000	6.426	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			
NGABS Test & Evaluation	MIPR	TBD : Various	-	7.627		0.426		-		-		-	0.000	8.053	Continuing
EOD RS	MIPR	NAVSEA Warfare Center Indian Head : Indian Head, MD	-	0.342	Jun 2020	-		-		-		-	0.000	0.342	Continuing
EOD RS	MIPR	MRIGlobal : Kansas City, MO	-	-		0.147	Apr 2021	-		-		-	0.000	0.147	Continuing
<b>Subtotal</b>			-	7.969		0.573		-		-		-	0.000	8.542	N/A

	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>		15.303	18.408	7.314	11.174	-	11.174	0.000	52.199	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 016 / Close Combat Capabilities ENG DEV

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
<b>Next Generation Advanced Bomb Suit (NGABS)</b>																												
NGABS OTA phase 1 (suit, sensors, HUD PDR/CDR)	█																											
NGABS OTA phase 2 (sensor, HUD CDR, suit HFE)					█																							
NGABS OTA phase 3 (integration, developmental test)					█																							
NGABS Support Contract													█															
Prototype Integration (PI) for Multi-Domain Operations (MDO)													█															
<b>Explosive Ordnance Disposal (EOD) Render Safe (RS)</b>																												
EOD RS Phase 0 Market Survey					▲																							
EOD RS Phase 0 Development Contracts					█																							
EOD RS Phase 0 Prototype Testing					█																							
EOD RS Phase 0 Solution Down Selection					▲																							
EOD RS Phase 0 Loadset Development									█																			
EOD RS Phase 0 ECM Preliminary Design Review									█																			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 016 / Close Combat Capabilities ENG DEV

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				
EOD RS SKO Phase 0 ECM Final Prototype Design Build																																
EOD RS SKO Phase 0 ECM Final Prototype Testing																																
EOD RS Technical Refresh (Multi Phase)																																
EOD RS Technical Refresh Phase 1																																
EOD RS Technical Refresh Phase 2																																
EOD RS Technical Refresh Phase 3																																
EOD RS Technical Refresh Phase 4																																
EOD RS Technical Refresh Phase 5																																



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 016 / Close Combat Capabilities ENG DEV

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Next Generation Advanced Bomb Suit (NGABS)	1	2017	4	2022
NGABS Materiel Development Decision (MDD)	2	2018	2	2018
NGABS OTA phase 1 (suit, sensors, HUD PDR/CDR)	4	2019	2	2020
NGABS OTA phase 2 (sensor, HUD CDR, suit HFE)	2	2020	4	2020
NGABS OTA phase 3 (integration, developmental test)	4	2020	3	2021
NGABS Support Contract	1	2022	1	2022
Prototype Integration (PI) for Multi-Domain Operations (MDO)	2	2022	1	2023
Explosive Ordnance Disposal (EOD) Render Safe (RS)	1	2020	4	2027
EOD RS Phase 0 Market Survey	4	2020	4	2020
EOD RS Phase 0 Development Contracts	4	2020	3	2021
EOD RS Phase 0 Prototype Testing	2	2021	3	2021
EOD RS Phase 0 Solution Down Selection	3	2021	3	2021
EOD RS Phase 0 Loadset Development	4	2021	4	2021
EOD RS Phase 0 ECM Preliminary Design Review	4	2021	4	2021
EOD RS SKO Phase 0 ECM Final Prototype Design Build	1	2022	3	2022
EOD RS SKO Phase 0 ECM Final Prototype Testing	4	2022	4	2022
EOD RS Technical Refresh (Multi Phase)	1	2023	4	2027
EOD RS Technical Refresh Phase 1	1	2023	4	2023
EOD RS Technical Refresh Phase 2	1	2024	4	2024
EOD RS Technical Refresh Phase 3	1	2025	4	2025
EOD RS Technical Refresh Phase 4	1	2026	4	2026
EOD RS Technical Refresh Phase 5	1	2027	4	2027

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev				<b>Project (Number/Name)</b> 415 / Mine Neutral/Detection			
<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>
415: Mine Neutral/Detection	-	15.473	1.925	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project 415: This Project provides for Engineering Manufacturing and Development (EMD) for the next generation of capabilities to detect, identify and neutralize hybrid threats and explosive hazards such as Improvised Explosive Devices (IEDs) and landmines. These capabilities are a Family of Systems (FOS) encompassing handheld, vehicle mounted, small robotic mounted, aerial platform mounted and area access, and neutralization systems operating in manned, remotely controlled, semi-autonomous or fully autonomous modes. Continued development of this FOS is necessary to support Route Clearance Platoons located within both Engineer Companies and Brigade Engineering Battalion Brigade Combat Teams.

The Husky Mounted Detection System (HMDS) is a counter-explosive device capability that provides standoff detection and marking of metallic encased caches and metallic and low-metallic antitank landmines, unexploded ordnance, trigger mechanisms, and improvised explosive devices (IEDs) in support of route and area-clearance operations. HMDS is a mission equipment package mounted on the Husky route clearance vehicle. The program was restructured in September 2016 to align with emerging shallow buried Wire Detection (WD) capabilities integrated onto the HMDS Increment A1 configuration (includes Ground Penetrating Radar (GPR)). These changes are necessary to adapt to changing IED threats. WD Technology will be fully integrated through Engineering Change Proposals (ECPs) at the end of FY20. Prototypes developed under the concluded HMDS Increment A2 effort may be leveraged in development of future capabilities. Future capabilities may include detection of deep buried IEDs and caches, and semi-autonomous control of the Husky vehicle and HMDS from inside a follow-on vehicle.

Route Clearance & Interrogation System (RCIS) Type I consists of a semi-autonomous vehicle and includes designated control vehicles and Operator Control Units (OCUs) which provide a standoff capability to detect and neutralize the full spectrum of explosive hazards. Type I integrates a semi-autonomous kit onto a High Mobility Engineering Excavator (HMEE) for remote control from a Buffalo Mine Protected Clearance Vehicle (MPCV). RCIS Type I semi-autonomous kit will be integrated onto the HMEE and be capable of interrogating and classifying explosive hazards. An OCU will be integrated into a Buffalo MPCV for Type I. RCIS capabilities will be fielded to Route Clearance Squads and Engineer Platoons which includes Tele-operation, RADAR-based Follow-Me, LIDAR obstacle detection, onscreen predictive turning map, and customizable camera views in order to achieve the RCIS mission.

Standoff Robotic Explosive Hazard Detection System (SREHD), formerly known as the Autonomous Mine Detection System (AMDS), provides increased survivability through mine and explosive hazards stand-off detection, marking and neutralization capability for the dismounted soldier. It provides area access and freedom of movement for the Commander. SREHD consists of payload modules to be mounted on man-portable unmanned ground vehicles. The payloads are for surface laid and buried threats to include mines and explosive hazards. This capability allows a soldier to remain in a protective posture while detecting and neutralizing a wide variety of hybrid and conventional explosive threats. SREHD conducted a successful Milestone (MS) C in April 2018 and initiated Low Rate Initial Production (LRIP) in June 2018. Due to the realignment of funds from FY 2020 through FY 2024 to higher Army priorities, the proponent withdrew support to the Standoff Robotic Explosive Hazard Detection System (SREHD) after Low Rate Initial Production (LRIP) award. Research, Development, Test and Evaluation (RDTE) tasks will conclude in FY 2019 under FY 2018 PE 0654808A, Project 415, Landmine Warfare/Barrier - Eng Dev, once corrective action plans and trainer re-development are completed. The program will

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> 415 / <i>Mine Neutral/Detection</i>
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conclude in June 2020 under FY 2018 OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) and PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335 for system qualification and production and receipt of LRIP quantities for an orderly program closeout.

Robotic Explosive Hazard Detection System (REHDS) provides the warfighter with a robotic mounted capability to detect and mark buried landmines and IEDs from a safe standoff distance. REHDS is an enabler for Soldier Lethality as it guarantees soldier maneuverability by enhancing the probability and speed of detection of buried landmines and IEDs allowing for increased speed of dismounted operations making the unit more efficient and lethal. REHDS is a new start in FY 2021 and begins in the Engineering and Manufacturing Development (EMD) phase. REHDS will leverage developed SREHD capability and incorporate increased Rate of Advanced Downtrack (RoAD) and Integration to the Man Transportable Robotic System (MTRS) II platform.

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> HMDS Program Management Support <b>Description:</b> Husky Mounted Detection System (HMDS) Program Management Support	1.544	-	-
<b>Title:</b> HMDS GPR: Engineer Change Proposal (ECP) to add Wire Detection and Infrared Illumination <b>Description:</b> HMDS A1 Tactical GPR: Engineer Change Proposal (ECP) to add Wire Detection and Infrared Illumination	3.512	-	-
<b>Title:</b> HMDS Testing and Test Support activities <b>Description:</b> HMDS Testing and Test Support activities	1.419	-	-
<b>Title:</b> HMDS A1 Auto-Height Improvements <b>Description:</b> Auto-Height Control	0.652	-	-
<b>Title:</b> HMDS Systems Training Product Development <b>Description:</b> Training product development to support Developmental test and limited user testing	0.865	-	-
<b>Title:</b> HMDS Program and Logistics Support <b>Description:</b> Program and Logistics support	0.946	-	-
<b>Title:</b> RCIS Type I <b>Description:</b> Route Clearance & Interrogation System (RCIS) Type I provides standoff capability to detect and neutralize the full spectrum of explosive hazards.	5.722	-	-
<b>Title:</b> Robotic Explosive Hazard Detection System (REHDS) <b>Description:</b> Robotic Explosive Hazard Detection System (REHDS)	-	1.925	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 415 / Mine Neutral/Detection

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>FY 2021 Plans:</b> Develop REHDS contract and conduct Materiel Development Decision.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Program has been delayed until FY 2023 and will be developed as Handheld Standoff Explosive Hazard Detection System (HSTEHDS) within Project. 415 / Mine Neutral/Detection.			
<b>Title:</b> SBIR/STTR	0.813	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	15.473	1.925	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• R64001: HUSKY MOUNTED DETECTION SYSTEM (HMDS)	75.586	95.608	26.823	-	26.823	-	-	-	-	-	-
• R68102: GRND STANDOFF MINE DETECTN SYSM (GSTAMIDS)BLK 1	40.680	2.497	-	-	-	-	-	-	-	-	-
• DA0924: Modification Of In Svc Equip	73.627	56.112	29.349	-	29.349	-	-	-	-	-	-
• M80400: Robotic Combat Support System (RCSS)	5.300	-	-	-	-	-	-	-	-	-	-
• R64003: HMDS - DEEP BURIED DETECTION	29.382	71.882	15.300	-	15.300	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The Husky Mounted Detection System (HMDS) program is pursuing an acquisition approach that delivers capability increments - Increment A, Configuration 1 (A1) to the Warfighter by leveraging the Quick Reaction Capability (QRC) Ground Penetrating Radar (GPR) currently deployed in support of Operation Enduring Freedom (OEF) and Operation Inherent Resolve (OIR). In FY 2020, the program will complete execution of an Engineering Change Proposals (ECP) to add a wire detection capability to address evolving threat, and Infrared illumination to enable nighttime operation, improve operational availability of the HMDS during inclement weather and address obsolescence and Cyber Security deficiencies.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> 415 / <i>Mine Neutral/Detection</i>
<p>The Route Clearance &amp; Interrogation System (RCIS) program executes an Engineering Manufacturing and Development (EMD) phase for Type I systems with an OEM contract award for Delta High Mobility Engineering Excavator (HMEE) support and a contract award in 4th quarter of FY 2018 to one EMD contractor for the Semi-Autonomous Control (SAC) Kit . The SAC Kit was awarded based on a source selection from full and open competition. The SAC EMD contract awardee will execute Preliminary Design Review (PDR), design, integration, and build phase of seven Semi-Autonomous Capability (SAC) kits, integrated onto six vehicles, with one kit available for engineering and System Integration Lab (SIL) evaluations. These assets enable the Government to execute a full Pre-Production Qualification Test (PPQT) and to evaluate against Capability Production Document (CPD) and performance specification requirements. Production and Technical Data Package (TDP) procurement options on the EMD contract take advantage of competition to assist in cost reduction. The RCIS Type I program Lifecycle Cost Estimate (LCCE), and associated budget request, was updated based on costs associated with modifying the base HMEE platform to accept the SAC kit, changes in the acquisition strategy and alignment of development and test activities in support of a production decision. To support EMD, ALUGS is funding Reset/Recap of four Buffalo Mine Protected Clearance Vehicle (MPCV) test assets at Letterkenny Army Depot. These will be provided to the SAC contractor for Operator Control Unit (OCU) integration.</p> <p>The Standoff Robotic Explosive Hazard Detection System (SREHD) (formerly known as AMDS) is currently in the Low Rate Initial Production (LRIP) phase to provide standoff detection, marking, and neutralization of explosive hazards (e.g., landmines, improvised explosive devices (IED), booby-traps (explosive), and unexploded ordnance (UXO)) in complex and urban terrain, including confined areas and subterranean environments (e.g., buildings, bunkers, tunnels, etc.). Transition to Low Rate Initial Production (LRIP) occurred 30 April 2018 under PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335, for the neutralization capability, as well under OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) for the detection and marking capabilities. Due to the realignment of funds beginning FY 2020 through FY 2024 to higher Army priorities, the proponent withdrew support to the Standoff Robotic Explosive Hazard Detection System (SREHD) after Low Rate Initial Production (LRIP) award. Subsequently, the Milestone Decision Authority (MDA) directed that FY 2019 funding will not be executed for this program. Due to timing, funding is still reflected in FY 2019. Research, Development, Test and Evaluation (RDTE) tasks will conclude in FY 2019 under FY 2018 PE 0654808A, Project 415, Landmine Warfare/Barrier - Eng Dev, once corrective action plans and trainer re-development are completed. The program will conclude in June 2020 under FY 2018 OPA R68260 / AREA MINE DETECTION SYSTEM (AMDS) and PAA E50510 / DEMO KIT, BLASTING: Munition Array Charge, XM335 for system qualification and production and receipt of LRIP quantities for an orderly program closeout.</p> <p>Robotic Explosive Hazard Detection System (REHDS) is a new start in FY 2021 and begins in the Engineering Manufacturing Development (EMD) phase. REHDS will develop the capability to detect and mark explosive hazards from a robotic platform to deliver standoff capability to the warfighter. REHDS will leverage developed SREHDS capability and incorporate the following two changes: Increased Rate of Advanced Downtrack (RoAD) and Integration to Man Transportable Robotic System (MTRS) II platform.</p>		

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 415 / Mine Neutral/Detection
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
HMDS System Engineering & Program Management	MIPR	PM Terrestrial Sensors : Fort Belvoir. VA	3.590	1.544	Mar 2020	-		-		-		-	0.000	5.134	-
Program Management - RCIS Type I	MIPR	PM FP : Warren, MI	4.982	0.582	Oct 2019	-		-		-		-	Continuing	Continuing	-
SREHD (Formerly AMDS) Program Management	Allot	JPEO A&A, PM CCS : Picatinny Arsenal, NJ	3.868	-		-		-		-		-	0.000	3.868	-
SREHD (Formerly AMDS) Program Closeout	Allot	JPEO A&A, PM CCS : Picatinny Arsenal, NJ	0.811	-		-		-		-		-	0.000	0.811	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	0.813		-		-		-		-	0.000	0.813	-
<b>Subtotal</b>			13.251	2.939		-		-		-		-	Continuing	Continuing	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
HMDS A1 Dev of Engineering Change Proposal w/ Wire Detect and InfraRed	SS/FFP	Chemring Sensors & Electronic Systems (CSES) : Dulles, VA	23.660	3.512	Nov 2019	-		-		-		-	0.000	27.172	-
HMDS Auto-height improvements	C/CPFF	TBD : TBD	-	0.652	Nov 2019	-		-		-		-	0.000	0.652	-
HMDS Systems Training Product Development	MIPR	CECOM : Various	0.892	0.865	Nov 2019	-		-		-		-	0.000	1.757	-
RCIS Type I	SS/FFP	J C Bamford : Pooler, GA	11.043	0.542	Oct 2019	-		-		-		-	0.000	11.585	Continuing
RCIS Type I test assets	MIPR	Letterkenny Army Depot : Letterkenny, PA	2.252	-		-		-		-		-	0.000	2.252	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> 415 / Mine Neutral/Detection
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<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
RCIS Type I SAC	C/CPIF	QinetiQ : Waltham, MA	3.700	3.834	Oct 2019	-		-		-		-	Continuing	Continuing	-
Multi-Function Video Display	MIPR	NVESD : Fort Belvoir, VA	4.472	-		-		-		-		-	3.047	7.519	3.047
Buffalo MPCV Interrogation Arm Improvements	C/CPFF	KRC : Houghton, MI	0.425	-		-		-		-		-	0.000	0.425	-
SREHD (Formerly AMDS) EMD and Trainer Re-development	C/CPIF	Carnegie Robotics LLC : Pittsburgh, PA	30.889	-		-		-		-		-	0.000	30.889	-
SREHD (Formerly AMDS) RAMS Type B Integration with Trainer	MIPR	ARL : Adelphi, MD	0.300	-		-		-		-		-	0.000	0.300	-
<b>Subtotal</b>			77.633	9.405		-		-		-		-	Continuing	Continuing	N/A

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
HMDS - Program and Logistics Support	MIPR	Various : Various	-	0.946	Nov 2019	-		-		-		-	0.000	0.946	-
RCIS Type I	MIPR	TARDEC, TACOM : Warren, MI	8.356	0.332	Oct 2019	-		-		-		-	Continuing	Continuing	-
SREHD (Formerly AMDS)	MIPR	Various : Various	13.676	-		-		-		-		-	0.000	13.676	-
Robotic Explosive Hazard Detection System	MIPR	CCDC - Picatinny : Picatinny Arsenal, NJ	-	-		1.925	Mar 2021	-		-		-	0.000	1.925	-
<b>Subtotal</b>			22.032	1.278		1.925		-		-		-	Continuing	Continuing	N/A







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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev		<b>Project (Number/Name)</b> 415 / Mine Neutral/Detection	

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	
<b>REHDS</b>																													
REHDS Develop/award REHDS Contract																													
REHDS MDD																													3
<b>Handheld Standoff Explosive Hazard Detection System (HSTEHDS)</b>																													
HSTEHDS Development Contract																													4
HSTEHDS MDD																													
HSTEHDS Integration Engineering																													5
HSTEHDS Risk Reduction Testing																													
HSTEHDS Prototype build																													6
HSTEHDS Product Qualification Testing																													
HSTEHDS MS C																													5
HSTEHDS Production Contract Award																													

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> 415 / <i>Mine Neutral/Detection</i>

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
HMDS	1	2016	1	2023
HMDS Increment A1 - MS C Review	4	2017	4	2017
HMDS Increment A1-TC/MR	3	2018	3	2018
HMDS Increment A1-FUE	3	2018	3	2018
HMDS Increment A1-IOC	3	2019	3	2019
HMDS Increment A1 Award ECP for WD	3	2018	4	2020
HMDS Risk Reduction/ECP	2	2017	1	2021
HMDS Increment A1 w/WD FUE	4	2020	4	2020
HMDS Testing	2	2018	1	2021
RCIS Type I	1	2015	4	2022
RCIS Type I MS B	4	2018	4	2018
RCIS Type I EMD SAC Contract	4	2018	4	2020
RCIS Type I EMD Delta HMEE contract	2	2019	4	2020
RCIS Type I Testing	2	2020	4	2020
RCIS Type I CDR	3	2019	3	2019
RCIS Type I TRR	3	2020	3	2020
Standoff Robotic Explosive Hazard Detection System (SREHD) (Formerly AMDS)	1	2018	4	2022
SREHD Regression Testing	1	2018	2	2018
SREHD Milestone C	3	2018	3	2018
SREHD Trainer Re-development Contract Modification	3	2018	3	2018
SREHD Low Rate Initial Production (LRIP) Award	3	2018	3	2018
SREHD Trainer Re-development	3	2018	3	2019

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> 415 / <i>Mine Neutral/Detection</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
SREHD Corrective Action Period (CAP)	4	2018	2	2019
SREHD FAT Build	2	2019	3	2019
SREHD Product Verification Test (PVT)	3	2019	4	2019
SREHD First Article Test (FAT)	4	2019	4	2019
SREHD LRIP Build	4	2019	3	2020
SREHD LRIP Deliveries	4	2019	3	2020
REHDS	1	2021	4	2025
REHDS Develop/award REHDS Contract	1	2021	4	2025
REHDS MDD	2	2021	2	2021
Handheld Standoff Explosive Hazard Detection System (HSTEHDS)	1	2023	4	2027
HSTEHDS Development Contract	1	2023	1	2024
HSTEHDS MDD	2	2023	2	2023
HSTEHDS Integration Engineering	1	2024	1	2025
HSTEHDS Risk Reduction Testing	1	2025	4	2027
HSTEHDS Prototype build	2	2025	3	2025
HSTEHDS Product Qualification Testing	3	2025	4	2025
HSTEHDS MS C	2	2026	2	2026
HSTEHDS Production Contract Award	2	2026	2	2026

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

<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev				<b>Project (Number/Name)</b> CS2 / Render Safe Sets Kits and Outfits (RS-SKO)			
<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>
CS2: Render Safe Sets Kits and Outfits (RS-SKO)	-	-	-	0.916	-	0.916	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project CS2: Funding in this program supports one of the Army's Cross Functional Teams (CFT) initiatives: Explosive Ordnance Disposal Render Safe Sets Kits and Outfits (EOD RS-SKO).

Explosive Ordnance Disposal Render Safe (EOD RS) provides for the Engineering and Manufacturing Development (EMD) and demonstration of capabilities needed for Explosive Ordnance Disposal (EOD) teams to Render Safe (RS) US and foreign ordnance and improvised explosive devices, enabling ground force commanders to retain freedom of maneuver and secure lines of communications. EOD RS-SKO equips EOD teams with low light visual augmentation system, electronic countermeasures, buried IED detection, dismounted X-ray imager, X-ray generator, trace explosive, Chemical, Biological, Radiological, and Nuclear (CBRN), and drug detection, unmanned aerial system, power management, gamma and neutron search and detection, and render safe initiation. This project will continue to support cross-service initiatives to increase commonality.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Explosive Ordnance Disposal (EOD) Render Safe (RS)	-	-	0.916
<b>FY 2022 Plans:</b> FY 2022 funding will support the build of the final ECM design prototypes and the testing of the final prototypes against requirements.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Program is transitioning from 016:Close Combat Capabilities ENG DEV in FY 2022.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	0.916

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

<b>Line Item</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>
• 016: Close Combat Capabilities ENG DEV	18.408	7.314	11.174	-	11.174	-	-	-	-	-	-
• R63701: Render Safe Sets Kits Outfits	102.684	145.313	84.000	-	84.000	-	-	-	-	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> CS2 / Render Safe Sets Kits and Outfits (RS-SKO)

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

**D. Acquisition Strategy**

The Explosive Ordnance Disposal (EOD) Render Safe (RS) program utilizes existing government contract vehicles to acquire prototype systems for testing and evaluation of the systems for down selection and inclusion in the capabilities package during Engineering and Manufacturing Development. The program will continue to use the existing government contract vehicles for the production and deployment phase as well as to continue the development of capabilities during the 5 phase technical refresh.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> CS2 I Render Safe Sets Kits and Outfits (RS-SKO)
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<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
EOD RS - Engineering Support	MIPR	DEVCOM C5ISR Center : Aberdeen Proving Ground (APG), MD	-	-		-		0.690	Oct 2021	-		0.690	Continuing	Continuing	-
EOD-RS - Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.076	Oct 2021	-		0.076	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		0.766		-		0.766	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
EOD- RS Test & Evaluation	MIPR	ATEC - Yuma Test Center : Yuma, AZ	-	-		-		0.150	Jul 2022	-		0.150	0.000	0.150	-
<b>Subtotal</b>			-	-		-		0.150		-		0.150	0.000	0.150	N/A

<b>Project Cost Totals</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>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	-	-	0.000	0.916	-	0.916	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> CS2 / Render Safe Sets Kits and Outfits (RS-SKO)	

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		
<b>Explosive Ordnance Disposal (EOD) Render Safe (RS)</b>																														
EOD RS Phase 0 Market Survey			▲ 1		EOD RS Market Survey																									
EOD RS Phase 0 Development Contracts					■					EOD RS Development Contract																				
EOD RS Phase 0 Prototype Testing									■					EOD RS Prototype Testing																
EOD RS Phase 0 Solution Down Selecting									▲ 2					EOD RS Down Select																
EOD RS Phase 0 Loadset Development													■					EOD RS Loadset Development												
EOD RS Phase 0 ECM Preliminary Design Review													■					EOD RS ECM Preliminary Design Review												
EOD RS Phase 0 ECM Final Prototype Design Build													■					EOD RS ECM Final Prototype Design Build												
EOD RS Phase 0 ECM Final Prototype Testing																	■					EOD RS ECM Final Prototype Testing								
EOD RS Technical Refresh (Multi Phase)																	■					EOD RS Tech Review								
EOD RS Technical Refresh Phase 1																	■					Phase 1 Tech Refresh								
EOD RS Technical Refresh Phase 2																					■					Phase 2 Tech Refresh				
EOD RS Technical Refresh Phase 3																									■					Phase 3 Tech Refresh



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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev		<b>Project (Number/Name)</b> CS2 / Render Safe Sets Kits and Outfits (RS-SKO)	

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
EOD RS Technical Refresh Phase 4																									Phase 4 Tech Refresh			
EOD RS Technical Refresh Phase 5																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> CS2 / <i>Render Safe Sets Kits and Outfits (RS-SKO)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Explosive Ordnance Disposal (EOD) Render Safe (RS)	1	2020	4	2025
EOD RS Phase 0 Market Survey	4	2020	4	2020
EOD RS Phase 0 Development Contracts	4	2020	3	2021
EOD RS Phase 0 Prototype Testing	2	2021	3	2021
EOD RS Phase 0 Solution Down Selecting	3	2021	3	2021
EOD RS Phase 0 Loadset Development	4	2021	4	2021
EOD RS Phase 0 ECM Preliminary Design Review	4	2021	4	2021
EOD RS Phase 0 ECM Final Prototype Design Build	1	2022	3	2022
EOD RS Phase 0 ECM Final Prototype Testing	4	2022	4	2022
EOD RS Technical Refresh (Multi Phase)	1	2023	4	2027
EOD RS Technical Refresh Phase 1	1	2023	4	2023
EOD RS Technical Refresh Phase 2	1	2024	4	2024
EOD RS Technical Refresh Phase 3	1	2025	4	2025
EOD RS Technical Refresh Phase 4	1	2026	4	2026
EOD RS Technical Refresh Phase 5	1	2027	4	2027

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev				<b>Project (Number/Name)</b> CS3 / Next Generation Advanced Bomb Suit (NGABS)			
<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>
CS3: Next Generation Advanced Bomb Suit (NGABS)	-	-	-	2.047	-	2.047	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Funding in this project supports the Soldier Lethality Cross Functional Team (CFT).

The NGABS program directly contributes to Soldier lethality and ground force commander freedom of maneuver by providing next generation sensor and optics in the cutting-edge Heads-Up-Display (HUD) while integrating the Government's latest investments in protective material for the modular, scalable NGABS bomb suit development. NGABS will increase the Warfighter survivability and mobility by optimizing Soldier protection for EOD personnel, while effectively managing all life cycle aspects of Personal Protective Equipment (PPE). Warfighter lethality is increased through bomb suit weight reduction utilizing extensive investments in protective material research and development. The result is material solutions that are lighter and are pieced together in a manner which increases Soldier mobility and longevity. EOD Soldier situational awareness and exposure to ballistic threats is enhanced through the NGABS HUD which allows the Soldier increased visibility under various obscurants and low/no-light situations. This program is not a new start. Funds were transferred from APE 0604808016 to clearly define the functions that are being completed with the NGABS funding line.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Next Generation Advanced Bomb Suit (NGABS)	-	-	2.047
<b>Description:</b> The objective of this effort is to increase the Warfighter lethality, modularity, and mobility, by optimizing Soldier protection and situational awareness for EOD personnel. The mission of this program is to enhance the tactical utility and applicability of this bomb suit concept by incorporating modularity/scalability and sensor technologies that are non-existent in legacy designs. This new, tailorable, full body protective system will provide a significantly increased capability at a reduced weight.			
<b>FY 2022 Plans:</b> During FY22, the NGABS program will complete its final milestones. This includes the delivery of the Interface Control Documents, the Level of Repair Analysis, and the final Technical Data Package, which provides specifications for all aspects of the system. After completion of these final milestones, the program utilizes the final documentation to complete the NGABS production milestone review, its subsequent approval, and begin to transition to production with contract award.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> CS3 / <i>Next Generation Advanced Bomb Suit (NGABS)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
This program is not a new start. Funds were transferred from APE 0604808016 to clearly define the functions that are being completed with the NGABS funding line.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	2.047

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

N/A

**Remarks**

**D. Acquisition Strategy**

The Next Generation Advanced Bomb Suit (NGABS) Program utilizes a competitive, developmental, innovative and efficient Other Transaction Authority (OTA) in EMD through the Fort Belvoir Sensor Communication and Electronic Consortium (SCEC) which will result in a production ready prototype leading to a Production and Deployment (PD) phase for full capability while ensuring best value to the Army. Milestone (MS) B / Material Development Decision (MDD) occurred in FY 2018 and MS C is scheduled for FY 2022.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604808A / Landmine Warfare/Barrier - Eng Dev				CS3 / Next Generation Advanced Bomb Suit (NGABS)							
Management Services (\$ in Millions)				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
NGABS	Allot	PdM SPE : Fort Belvoir	-	-		-		0.338		-		0.338	0.000	0.338	Continuing
<b>Subtotal</b>			-	-		-		0.338		-		0.338	0.000	0.338	N/A
Product Development (\$ in Millions)				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
NGABS - Production Prototype Development	C/FFP	TBD : Manufacturing Techniques Inc. (MTEQ), Lorton, VA	-	-		-		1.009		-		1.009	0.000	1.009	Continuing
<b>Subtotal</b>			-	-		-		1.009		-		1.009	0.000	1.009	N/A
Support (\$ in Millions)				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
NGABS Support Costs	MIPR	TBD : Various	-	-		-		0.542		-		0.542	0.000	0.542	Continuing
<b>Subtotal</b>			-	-		-		0.542		-		0.542	0.000	0.542	N/A
Test and Evaluation (\$ in Millions)				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
NGABS Test & Evaluation	MIPR	TBD : Various	-	-		-		0.158		-		0.158	0.000	0.158	Continuing
<b>Subtotal</b>			-	-		-		0.158		-		0.158	0.000	0.158	N/A
<b>Project Cost Totals</b>			-	-		0.000		2.047		-		2.047	0.000	2.047	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 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev			<b>Project (Number/Name)</b> CS3 / Next Generation Advanced Bomb Suit (NGABS)				
	<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**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / Landmine Warfare/Barrier - Eng Dev	<b>Project (Number/Name)</b> CS3 / Next Generation Advanced Bomb Suit (NGABS)

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
<b>Next Generation Advanced Bomb Suit (NGABS)</b>																												
NGABS OTA phase 5 (final fixes, tech data and system delivery)																												
NGABS MS C													 NGABS MS C															
NGABS production award																												
NGABS First Article Test (FAT)																												
NGABS production																												
NGABS Type Classification (TC)																												
NGABS Initial Operation Capability (IOC)																					 NGABS IOC							
NGABS Full Operational Capability (FOC)																									 NGABS FOC			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604808A / <i>Landmine Warfare/Barrier - Eng Dev</i>	<b>Project (Number/Name)</b> CS3 / <i>Next Generation Advanced Bomb Suit (NGABS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Next Generation Advanced Bomb Suit (NGABS)	1	2022	4	2024
NGABS OTA phase 5 (final fixes, tech data and system delivery)	1	2022	2	2022
NGABS MS C	2	2022	2	2022
NGABS production award	2	2022	3	2023
NGABS First Article Test (FAT)	3	2022	1	2023
NGABS production	3	2022	4	2024
NGABS Type Classification (TC)	3	2022	2	2023
NGABS Initial Operation Capability (IOC)	4	2023	4	2023
NGABS Full Operational Capability (FOC)	4	2024	4	2024



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

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software
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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	-	124.749	128.676	162.704	-	162.704	-	-	-	-	-	-
323: Common Hardware Systems	-	5.255	4.816	4.592	-	4.592	-	-	-	-	-	-
C29: Centralized Technical Support Facility (CTSF)	-	8.406	6.981	11.438	-	11.438	-	-	-	-	-	-
C34: Army Tac C2 Sys Eng	-	9.092	9.351	11.473	-	11.473	-	-	-	-	-	-
EJ4: COMMAND POST COMPUTING ENVIRONMENT (CPCE)	-	29.694	26.485	35.117	-	35.117	-	-	-	-	-	-
EJ5: MOUNTED COMPUTING ENVIRONMENT (MCE)	-	10.033	9.994	21.874	-	21.874	-	-	-	-	-	-
EJ6: TACTICAL ENHANCEMENT	-	-	-	7.860	-	7.860	-	-	-	-	-	-
EK9: TACTICAL NETWORK OPERATIONS AND MANAGEMENT	-	3.499	3.252	3.366	-	3.366	-	-	-	-	-	-
EQ8: Mobile/Handheld Computing Environment (M/HHCE)	-	4.658	4.967	5.105	-	5.105	-	-	-	-	-	-
ER9: Expeditionary Army Command Post	-	27.706	43.803	52.477	-	52.477	-	-	-	-	-	-
EW3: Unit Task Reorganization (UTR) Development	-	26.406	19.027	9.402	-	9.402	-	-	-	-	-	-

**Note**  
Project EJ6 / TACTICAL ENHANCEMENT is a new start for Fiscal Year (FY) 2022.

**A. Mission Description and Budget Item Justification**  
This funding line supports the Army Network Modernization Strategy LOE 1, Unified Network, LOE 2 - Common Operating Environment and LOE 4 - Command posts. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>
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Project 323, the Common Hardware Systems (CHS), is an ACAT III program and mandated Army Strategic Source that acquires and sustains highly flexible, cost-effective, and simplified non-developmental solutions that integrates the latest and emerging commercial information technology onto the Converged Mission Command Network. This funding line supports all of the Army's Network Modernization Strategy Lines of Effort: (1) Unified Network, (2) Common Operating Environment, (3) Interoperability, and (4) Command Post Mobility and Survivability. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve network modernization strategy goals. This funding line also supports network solution procurement and sustainment for U.S. Army Reserves, U.S. Army National Guard, U.S. Navy, U.S. Air Force, U.S. Marine Corps, Federal Bureau of Investigation, and other Federal Agencies. CHS continuously analyzes and tracks hardware from cradle-to-grave, from emerging technology until end-of-life. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs, Joint Services, and other Federal Agencies. CHS supports better buying power initiatives by creating efficiencies through economies of scale, price breaks, streamlined processes, reduced cycle times, and centralized contracting.

Project C29, the Central Technical Support Facility (CTSF), is the Army's single strategic facility responsible for executing Army Interoperability Certification (AIC) system of system verification/validation checkout, testing, and configuration management for the Army's LandWarNet Baseline. The Centralized Technical Support Facility (CTSF) funding line supports the Army's Network Modernization Strategy Line of Effort LOE 1B Network Enabling Functions.

Project C34, the Army Tac C2 Sys Eng project funds the PEO Command, Control, Communications-Tactical (PEO C3T) the System-of-Systems engineering, Enterprise and Integration efforts. The system engineering efforts are to facilitate the overall network interoperability of all the various programs that must be able to seamlessly connect together while addressing their individual distinct requirements. Efforts address continuing evolution of the network within the PEO C3T portfolio of technology across capability enhancement packages, in line with the Network CFT capability set strategy, to deliver efficient and effective cross-domain technical solution.

Project EJ4, the Command Post Computing Environment (CPCE) implements an integrated, interoperable, cyber-secure, software infrastructure that serves as the host for a unified set of multiple warfighting functional applications within the command post at all echelons (Battalion to Army Service Component Commander); eliminating "stove-piped" legacy systems, duplicative or redundant implementations, simplifying future application development efforts, and enhancing interoperability and data sharing across multiple echelons. CPCE software infrastructure and applications reside on Tactical Server Infrastructure (TSI) hardware and previously fielded BCCS/TSI servers. CPCE/TSI provides the hardware infrastructure to host capabilities, such as movement and maneuver applications, network enabling tools (i.e. Cyber Situational Understanding and Tactical Defensive Cyber Operation Infrastructure) and warfighting function applications. This software infrastructure provides the Army's premier Common Operating Picture (COP) solution, allowing interoperability between command posts, mounted platforms, and dismounted handheld devices while supporting collaboration with Joint and Unified Action partners. CPCE provides common look and feel (user interface), common data strategy, interoperable tactical messaging/ chat, and essential movement and maneuver capabilities.

Project EJ5, the Mounted Computing Environment (MCE), is one of the six computing environments (CEs) formalized by the AAE under the Common Operating Environment (COE) initiative. MCE is now called, Mounted Mission Command - Software (MMC-S), an ACAT II program, after a successful Materiel Development Decision (MDD) briefing in Feb. 2020. MMC-S standardizes end-user environments and enables streamlined deployment of new warfighting applications while leveraging existing hardware under the Joint Battle Command - Platform program. Requirements for MMC-S are established in the AROC approved COE Information

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	
<p>Systems Initial Capability Document (IS ICD) and the approved Mounted Computing Environment Requirements Definition Package (RDP). The MMC-S will provide incremental improvements with additional application capabilities over time, and will be interoperable with Command Post and Mobile/Handheld systems.</p> <p>Project EJ6, Tactical Enhancement supports the evaluation and testing requirements for Terrestrial Transmission (TRILOS) and Troposcatter Transmission (TROPO) capabilities procured and fielded under the Signal Modernization (SIGMOD) funding line, B00010. TRILOS and TROPO will provide redundancy communications in a Satellite denied environment by providing improved Line of Sight and beyond line of sight radio systems. In addition this funding will support development of Network Centric Waveform-Resilient (NCW-R). NCW-R is a critical, near-term set of modifications to the current WIN-T SATCOM waveform that will provide limited protection against our adversaries' ability to jam tactical SATCOM Command and control communications on Wideband Global SATCOM (WGS) satellites. NCW-R will provide anti-jam capability and resiliency to WIN-T Program of Record satellite terminals in contested environments. The NCW-R waveform software will operate on WIN-T satellite modems. NCW-R will provide a bridging capability until the next generation protected satellite constellation is launched by the Air Force (projected FY 2028/2029). The current anti-jam protection is limited to two SMART-T terminals per BCT, division and Corps HQs, leaving battalions vulnerable to being isolated during jamming events.</p> <p>Project EK9, Tactical Network Operations Management's (TNOM) purpose is to create Unified Network Operations (UNO). UNO is a software centric, integrated NetOps capability being developed, as a rapid prototype - proceeding under Section 804 Mid-Tier Acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM). Enabling common planning, configuration, monitoring, provisioning, management, and defense of the Network, UNO configures and integrates tactical and enterprise networks to allow delivery of information and communications among Soldiers at all echelons utilizing network resources prioritized according to the Commander's intent. In developing UNO, TNOM follows the Army's Development of Operations (DevOps) approach - creating Network Operations (NetOps) prototypes, gaining user feedback, making adjustments and ultimately delivering enhanced capabilities to the operational force in the shortest time possible. UNO development incorporates solutions available in industry and through government agencies - assessing them in an adapt-and-buy approach informed by experimentation, demonstration, and modernization.</p> <p>Project EQ8, Mobile/Handheld Computing Environment (M/HHCE), is one of the six computing environments (CEs) formalized by the AAE under the Common Operating Environment (COE) initiative and supports the Nett Warrior (NW) also known as the Ground Soldier Systems (GSS) program. The program leverages commercial smart devices and secure Army tactical radios, Commercial 4G/LTE/WIFI and cloud-based infrastructure to provide the dismounted leader an integrated mission command and situational awareness system for use during combat operations. The NW system provides leaders electronic real-time information on friendly positions; information about enemy activity and movement; navigational data and map imagery; a collaborative planning tool; and other mission related graphics which effectively puts the power of the entire Army tactical network in the hands of the dismounted leader. The NW hardware is the computational platform that other M/HHCE systems run their applications. The M/HHCE will provide incremental improvements with additional application capabilities over time, and will be interoperable with Command Post CE and Mounted CE systems.</p> <p>Project ER9, Command Post Integrated Infrastructure (CPI2), fields mobile Command Post nodes by integrating mission command solutions into vehicle platforms and mounted shelter systems to enhance the survivability and mobility of command post formations. CPI2 will replace selected elements of the legacy command post to provide improved expeditionary capability, survivability, agility, and scalability for command post formations at all echelons. By integrating mission command</p>		

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>
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warfighting functions on to vehicle platforms, a dispersed command post construct will enable the battle staff to blend in with the overall maneuver formation while giving the commander the ability to synchronize the close fight on the move.

Project EW3, Unit Task Reorganization (UTR) funding line supports the Army Network Plan Framework objective to deliver a Standards Based Network Architecture. This will enable modernizing the Mission Command Network through the coordination of a common set of network operations tools and infrastructure development supporting the unit communication staff's ability to conduct Network Planning, Network Provisioning and Network Management. Network Planning efforts include the development of an integrated planning tool suite to improve Signal Soldiers ability to plan and develop configurations for upcoming operations and deployments. Network Provisioning efforts include development of tools and technology that provide a means to deliver configurations developed during the Network Planning with little to no manual involvement by the Soldier. Network Management efforts replace stove-piped management systems and replaces them with integrated tools that provide a consolidated, as well as detailed, view of the network and its components.

<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	129.974	162.513	156.333	-	156.333
Current President's Budget	124.749	128.676	162.704	-	162.704
Total Adjustments	-5.225	-33.837	6.371	-	6.371
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-28.269			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-5.225	-5.568			
• Adjustments to Budget Years	-	-	6.371	-	6.371

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> 323 / Common Hardware Systems			
<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>
323: Common Hardware Systems	-	5.255	4.816	4.592	-	4.592	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Common Hardware Systems (CHS) is an ACAT III program and mandated Army Strategic Source that acquires and sustains highly flexible, cost-effective, and simplified non-developmental solutions that integrate the latest and emerging commercial information technology onto the Converged Mission Command Network. This funding line supports all of the Army's Network Modernization Strategy Lines of Effort: (1) Unified Network Transport, (2) Common Operating Environment, (3) Interoperability, and (4) Command Post Mobility and Survivability. Efforts are aligned to support the Network Cross-Functional Team (CFT) capability set approach to achieve network modernization strategy goals. This funding line also supports network solution procurement and sustainment for U.S. Army Reserves, U.S. Army National Guard, U.S. Navy, U.S. Air Force, U.S. Marine Corps, Federal Bureau of Investigation, and other Federal agencies. Since FY19, CHS has seen a 47 percent increase in its customer base and continues to see an increase in unit procurements.

CHS provides technical support, environmental and survivability testing, system design, and end-of-life and configuration management services to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS continuously analyzes and tracks hardware from cradle to grave; from emerging technology until end of life. The program conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs, agencies, Joint Services, and other Federal Agencies including: Mission Command; Tactical Network; Tactical Radios; Distributed Common Ground Station Army; Aviation Systems; Counter Rocket, Artillery, Mortar; Communication Electronics Command; Combat Capabilities Development Command (CCDC), Army National Guard and Reserves, Navy, Airforce, Marines, the Federal Bureau of Investigation, among others. CHS rapidly procures common hardware configurations across the Integrated Tactical Network (ITN), Common Operating Environment (COE), the sustainment community, and tactical programs that enable the continuous modernization in support of all four Army Network Modernization Lines of Effort and Network CFT requirements. CHS logistical services include worldwide, 72-hour turn-around repair through strategically located support centers for tactical military units. These support centers provide tailorable supply chain and cybersecurity measures, customizable warranty management, maintenance and failure rate reporting, and technical support services to support specific Army program requirements.

CHS is a model for modern acquisition strategy that strengthens the U.S. cybersecurity supply chain and manages risk by providing hardware solutions including servers, storage, clients, networking devices, tactical radios, ruggedized platforms, hand-held end devices, operational transit cases, installation kits, and peripheral devices procured from a mix of small and large businesses. CHS partners with the CECOM Integrated Logistics Support Center (ILSC) to develop a model for sustaining COTS IT using the Standard Army Supply System. CHS maintains a Public-Private Partnership (P3) with Tobyhanna Army Depot (TYAD) in order to leverage the innovation, resources and leadership skills of both TYAD and CHS in order to provide the best value to the taxpayer while delivering the best capability to the Soldier.

CHS supports Better Buying Power (BBP) initiatives by creating efficiencies on a micro and macro level through volume discounting, economies of scale, the elimination of duplication of effort, reduced barriers to entry, price breaks, streamlined processes, reduced cycle times, and centralized contracting. The program provides the Army with a highly efficient Return on Investment (ROI) of approximately 30:1.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> 323 / Common Hardware Systems		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Acquisition Support</p> <p><b>Description:</b> Funding is provided for the following effort.</p> <p><b>FY 2021 Plans:</b> Will continue acquisition support for CHS and customer programs. CHS rapidly procures common hardware configurations across the Common Operating Environment (COE), the sustainment community, and tactical programs that enables the continuous modernization of a converged network. PMO costs will be covered by OMA funding.</p> <p><b>FY 2022 Plans:</b> Will continue acquisition support for CHS and customer programs. CHS rapidly procures common hardware configurations across all four Network Modernization Lines of Effort and Network Cross Functional Team (CFT). Supports tactical programs that enable the continuous modernization of a unified network requirements, the sustainment community, and DoD and Federal Government customers. Additional efforts include pre-award activities for the 6th generation CHS contract. PMO costs will be covered by OMA funding.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The decrease of .229 from FY21 to FY22 covers the decrease to scope.</p>		3.373	2.552	2.323
<p><b>Title:</b> Logistical Service Support</p> <p><b>Description:</b> Funding is provided for the following effort.</p> <p><b>FY 2021 Plans:</b> CHS logistical services include worldwide 72-hour turnaround repair through strategically located support centers for tactical military units, tailorable supply chain and cybersecurity measures, manages customizable warranty, maintenance and failure rate reporting, and technical support services to support specific Army program requirements.</p> <p><b>FY 2022 Plans:</b> CHS logistical services include worldwide 72-hour turnaround repair through strategically located support centers for tactical military units, tailorable supply chain and cybersecurity measures, manages customizable warranty, maintenance and failure rate reporting, and technical support services to support specific Army program requirements.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The increase of .041 from FY21 to FY22 covers the standard inflation of labor and materials cost.</p>		0.339	0.359	0.400
<p><b>Title:</b> Technical and Test Support</p> <p><b>Description:</b> Funding is provided for the following effort.</p>		1.543	1.705	1.667

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> 323 / Common Hardware Systems

<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> CHS provides technical support, environmental and survivability testing, system design, end of life/configuration management, and strengthens cyber security/supply chain management across Army tactical programs to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs and agencies.</p> <p><b><i>FY 2022 Plans:</i></b> CHS provides technical support, environmental and survivability testing, system design, end of life/configuration management, and strengthens cyber security/supply chain management across Army tactical programs to ensure interoperability and integration of hardware throughout the computing infrastructure. CHS conducts hardware evaluations that facilitate and simplify the selection of common hardware solutions across numerous Army programs and agencies.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> The decrease of .038 from FY21 to FY22 covers the decrease in scope.</p>			
<p><b><i>Title:</i></b> Contract Support Services</p> <p><b><i>Description:</i></b> Funding is provided for the following effort.</p> <p><b><i>FY 2021 Plans:</i></b> Contract Support Services are required to provide continuing expedited acquisition support for customer procurements.</p> <p><b><i>FY 2022 Plans:</i></b> Contract Support Services are required to provide continuing expedited acquisition support for customer procurements.</p> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> The increase of .002 from FY21 to FY22 covers the standard inflation of labor and materials cost.</p>	-	0.200	0.202
<b>Accomplishments/Planned Programs Subtotals</b>	5.255	4.816	4.592

<p><b>C. Other Program Funding Summary (\$ in Millions)</b> N/A</p> <p><b>Remarks</b></p> <p><b>D. Acquisition Strategy</b> CHS is currently executing an approved acquisition strategy to facilitate the procurement of commercial IT through a single step, full and open competition contract. The fifth generation of the contract (CHS-5) was awarded on 24 AUG 2018; 5 years/IDIQ. A single prime vendor was selected as the program integrator. The CHS-5 contract</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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	<b>Project (Number/Name)</b> 323 / <i>Common Hardware Systems</i>
<p>provides seamless, rapid, and consolidated procurement of commercial IT, customizable sustainment strategies, non-personal services, and continuous technology upgrades to support tactical programs fielding schedules, configuration management, and ruggedization.</p> <p>Since the inception of the CHS-5 contract, there have been 208 technology insertions, 461 delivery orders, 57 task orders, and 212,096 items delivered to 133 unique customers. Additionally, since its inception, the CHS-5 contract yielded a cost avoidance of \$211 million to its customers. FY20 yielded 411 actions awarded (87 TIs, 290 DOs, and 34 TOs) for a total of \$474,854,623. FY20 actions surpassed FY19 by 7.3%.</p> <p>The sixth generation CHS contract (CHS-6) is in the early stages of development. Extensive market research is being conducted to identify the acquisition strategy for this effort. The CHS PMO holds frequent and open discussions with industry to ensure the requirements are clearly understood and feedback can be gleaned from hardware developers and manufacturers to maximize competition. The CHS PMO is exploring innovative ways to shape the CHS-6 contract to allow all Federal Agencies with tactical requirements to achieve their missions and strategic initiatives by providing a rapid and streamlined process and access to critical Commercial Information Technology. The CHS-6 contract award is estimated to be 2QFY23.</p>		



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> 323 / Common Hardware Systems
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<b>Management Services (\$ 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			
SBIR/STTR Transfer	Various	Various : TBD	-	0.226		0.182	Jan 2021	-		-		-	0.000	0.408	-
<b>Subtotal</b>			-	0.226		0.182		-		-		-	0.000	0.408	N/A

<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			
Support Costs	C/FP	Various : Various	83.563	-		-		-		-		-	0.000	83.563	-
Product Procurement	C/FP	Various : Various	92.177	-		-		-		-		-	0.000	92.177	-
Technology Insertion	C/FP	Various : Various	17.780	-		-		-		-		-	0.000	17.780	-
CHS-5 Non-Recurring Engineering	C/FP	Various : Various	0.472	-		-		-		-		-	0.000	0.472	-
Acquisition Support	C/FP	Various : Various	5.552	3.147	Dec 2019	2.370	Dec 2020	2.323	Dec 2021	-		2.323	Continuing	Continuing	Continuing
Logistical Service Support	C/FP	Various : Various	1.062	0.339	Dec 2019	0.359	Dec 2020	0.400	Dec 2021	-		0.400	Continuing	Continuing	Continuing
Technical & Test Support	C/FP	Various : Various	3.114	1.543	Dec 2019	1.705	Dec 2020	1.667	Dec 2021	-		1.667	Continuing	Continuing	Continuing
<b>Subtotal</b>			203.720	5.029		4.434		4.390		-		4.390	Continuing	Continuing	N/A

<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			
Contract Support Services	SS/CR	APG, MD : APG, MD	-	-		0.200	Dec 2020	0.202	Dec 2021	-		0.202	0.000	0.402	-
<b>Subtotal</b>			-	-		0.200		0.202		-		0.202	0.000	0.402	N/A

			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>			203.720	5.255	4.816	4.592	-	4.592	Continuing	Continuing	N/A

**Remarks**

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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 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software		<b>Project (Number/Name)</b> 323 / Common Hardware Systems	

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
Technology Insertion & Technical Support (Adding New Hardwa	[Redacted]																											
Environmental and First Article Testing	[Redacted]																											
RESET and Deep Cleaning/Out of Warranty Repair	[Redacted]																											
HW Implementation, Integration and Evaluation	[Redacted]																											
CHS-5 Hardware Deliveries	[Redacted]																											
CHS-6 Pre-Contract Award	[Redacted]																											
CHS-6 Award	[Redacted]																											

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> 323 / Common Hardware Systems

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology Insertion & Technical Support (Adding New Hardware to Contract)	1	2007	4	2026
Environmental and First Article Testing	1	2006	4	2026
RESET and Deep Cleaning/Out of Warranty Repair	1	2006	4	2026
HW Implementation, Integration and Evaluation	1	2006	4	2026
CHS-4 Hardware Deliveries	1	2012	4	2019
CHS-5 Contract Award	4	2018	4	2018
CHS-5 Hardware Deliveries	4	2018	4	2023
CHS-6 Pre-Contract Award	2	2020	2	2023
CHS-6 Award	2	2023	2	2023

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)			
<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>
C29: Centralized Technical Support Facility (CTSF)	-	8.406	6.981	11.438	-	11.438	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project C29, The Centralized Technical Support Facility (CTSF): The CTSF is the Army's premier test and certification facility for System of Systems interoperability, functioning as CIO/G6's designated independent test agent and Land/WarNet/Mission Command (LWN/MC) configuration manager. The Central Technical Support Facility's (CTSF) directed mission is to perform Army Interoperability Certification (AIC) testing and configuration management for all 23 operational through tactical level Command, Computing, Control, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR) systems, Mission and Space systems, Aviation systems and other individual, family, and system of systems, applications, and hardware prior to release to the field. The CTSF accomplishes this through the enforcement of a standards based architecture while supporting the development and implementation of an integrated computing infrastructure and a converged network. The CTSF provides validated test data to the Department of the Army and Joint agencies to accredit interoperability certifications. The distributed test environment of the CTSF is accomplished through the Federation of Net-centric Sites (FaNS) construct. This FaNS construct addresses distributed integration development and testing using the core infrastructure of the CTSF to harness Army and Joint expertise/resources. Through these federated resources, the CTSF executes or supports interoperability development, integration and certification testing of the systems and system of systems in the Warfighter Mission Area, to include Network Evaluation spinouts, as they become part of the Army's LandWarNet. The cited work is consistent with Strategic Planning Guidance and the Army Modernization and Strategy Plan.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Army Interoperability Certification (AIC) Testing	5.308	4.875	3.893
<b>Description:</b> Conduct Army Interoperability Certification (AIC), planning/coordination/scheduling/ and reporting of Common Operating Environment (COE) and software block testing (local and distributed). Additionally, provide stakeholders data collection/data analysis/data dissemination/simulation/stimulation verification/validation in support of Army geospatial interoperability certification, system of system cybersecurity posture assessment and individual system cybersecurity policy adjustment. Manage the set-up, configuration, integration, operations and maintenance of the LandWarNet/Mission Command (LWN/MC) systems within the CTSF test environments. Function as the HQDA G-6's Independent Test Agent for Program Managers of LWN/MC systems that have an Acquisition Life Cycle requirement for testing interoperability of software and associated hardware prior to fielding to the Warfighter. Act as the central control node to synchronize the HQDA G-6 accredited Federation of Net-centric Sites (FaNS) distributed AIC testing environment. Report the results of Army Interoperability Certification tests to the HQDA G-6, PM, TRADOC and AFC communities.			
<b>FY 2021 Plans:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue SWB11-12 test planning, test case development, test environment architecture set-up, for interoperability testing, Geospatial Information Systems (GIS) interoperability assessment, cyber security posture assessment and adjustment activities for the systems that comprise the Army?s tactical baselines. Conduct interoperability testing for the SWB11-12 systems that comprise the LWN/MC baseline to ensure the tactical integrated computing infrastructure is interoperable in a System of Systems (SoS) environment and to enable the CIO G6 to enforce a standards based architecture. Mature the capability that assists CIO/ G-6 requirement to support ATEC and AFC by executing interoperability assessments of Cross-Functional Team (CFT) solutions. Execute discreet AIC test events (up to 6x/yr) and maintain an enduring discreet AIC test capability. Implement an AIC Secret Releasable test environment that integrates Army and the Mission Partner Environment and support testing with our FYES, ABCANZ, and G-3 Big Ten Coalition partners.</p> <p><b>FY 2022 Plans:</b> Continue SWB11-12 test planning, test case development, test environment architecture set-up, for interoperability testing, Geospatial Information Systems (GIS) interoperability assessment, cybersecurity posture adjustment and assessment activities for the systems that comprise the Army?s tactical software baselines. Conduct COE v3.0 planning, test case development and architecture set-up to support the technical standards update timelines for the Army?s tactical software baseline. Conduct interoperability testing for the SWB11-12 and COE v3.0 systems that comprise the LWN/MC baseline to ensure the tactical integrated computing infrastructure is interoperable in a System of Systems (SoS) environment and to enable the HQDA G-6 to enforce a standards based architecture. Complete the virtualization of the technical environment and test methodology needed to virtualize the tactical network and the tactical systems required to support AIC testing. Partner with ATEC and AFC to leverage the CTSF assets in support of PMs? Operational Test activities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to leveraged efficiencies in contractor manpower utilization in support of mission execution.</p>			
<p><b>Title:</b> Engineering Services</p> <p><b>Description:</b> Provide network engineering support to establish and maintain tactical architectures on the CTSF test floors and to deploying/fielded units at training centers around the world (JRTC, NTC, JMRC). System engineering support provides hardware virtualization, Army End Point Security System (AESS) support, system validation and integration support to numerous PMs on the integration and risk reduction labs, and assists Army programs with interoperability assessments and AIC rehearsal. Modify and merge army data products for CTSF test architectures. Continuously seek emerging markets. Develop/Maintain Applications for CTSF Configuration Tracking System Version 4 (CMTSv4).</p> <p><b>FY 2021 Plans:</b> Provide Network support for integration and test floors, network support to fielded units, and systems engineering and analysis support to system of systems integration activities. Integrate and implement Army End Point Security System (AESS) technology,</p>	0.094	0.162	0.195

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>assist PMs in the development of AESS policies. Plan and conduct engineering evaluations for AIC testing and data collection in the Joint Warfighter Assessment (JWA)/Capability Integration Evaluation (CIE) to leverage the operational environment and JWA/CIE resources. Work with Network Cross Functional Team on Network modernization and Integrated Tactical Network (ITN) design and testing. Assist integration and test architecture development to include Program of Record (POR) and non-POR radio communications devices to provide PMs and Materiel Developers testing in realistic environments. Conduct radio Verification and Validation. Support Army Test and Evaluation Command (ATEC) and Army Futures Command interoperability assessments of Cross-Functional Team (CFT) solutions. Continue efforts to implement an AIC Secret Releasable test environment network that integrates Army and the Unified Action Partners (UAP).</p> <p><b>FY 2022 Plans:</b> Provide Network support for integration and test floors, network support to fielded units, and systems engineering and analysis support to system of systems integration activities. Enhance the Security posture of the CTSF by ensuring the latest Information Assurance Vulnerability Alerts (IAVAs) and Security Technical Implementation Guides (STIGs) are implemented as required by Risk Management Framework (RMF). Integrate and implement Army End Point Security System (AESS) technology, assist PMs in the development of AESS policies. Plan and conduct engineering evaluations for AIC testing and data collection in the Joint Warfighter Assessment (JWA)/Capability Integration Evaluation (CIE) to leverage the operational environment and JWA/ CIE resources. Work with Network Cross Functional Team on Network modernization and Integrated Tactical Network (ITN ) design and testing. Assist integration and test architectures to include Program of Record (POR) and non-POR Soldier radio waveforms to provide PMs and Materiel Developers testing in realistic environments. Support Army Test and Evaluation Command (ATEC) and Army Futures Command interoperability assessments of Cross-Functional Team (CFT) solutions. Continue efforts to implement an AIC Secret Releasable test environment network that integrates Army and the Unified Action Partners (UAP).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due use of Cost and Economic Analysis Center (CEAC) planning rate for 1 Acq Demo work year.</p>				
<p><b>Title:</b> Configuration Management</p> <p><b>Description:</b> As the CTSF Configuration Management Office, provide CM functional and physical configuration management and change management to the CTSF Army Interoperability Certification test floor environment. Additionally, as the Army Configuration Management Office (ACMO), establish and maintain oversight control of the Army Master Library for the Army Interoperability Certified Fielded Baseline (AICFB). Archive system software and data products, correlated with their associated documentation, for the Army LandWarNet Mission Command Baseline (ALWNMCB), a subset of the AICFB. Establish and maintain the configuration and change management to the AICFB and the ALWNMCB for Lifecycle Software Management (LCSM). Provide support to the Army Staff (ARSTAF), Materiel Developers (MATDEV), Project Managers (PM), and System Owners (SO) through the orderly management of product configuration information and product change management (ChM), which enables capability revisions, improved reliability and maintainability, and extended life-cycle. Maintain and improve the</p>		2.271	1.558	1.028

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Configuration Management Tracking System version 3 (CMTSIII), the Army's authoritative database management system (DBMS) for configuration management (CM) of the systems comprising Coalition Interoperability Assurance and Validation (CIAV), and the Warfighter Mission and Business Mission Areas of the Army Information Technology (IT) portfolio. Assist the HQDA G-6 conduct accreditation inspections and training for Federation of Net-centric Sites (FaNS) locations.</p> <p><b>FY 2021 Plans:</b> Provide CM functional and physical configuration management and change management to the CTSF Army Interoperability Certification test floor environment. Provide CM functional and physical configuration management and change management to the AICFB, to include archiving the required system software, data products and documentation, while correlating the relevant data within the CMTSIII DBMS for visibility to users Army wide. Provide baseline reconciliation to the four quarterly CIO/G6 AICFB reports, identifying to commanders and their G-3/G-6 staff the Army's AIC certified, Interoperability Capability and Limitations assessed, AIC waived, and AIC exempted system software that is authorized to connect to the Army's network. Assist the CIO/G6 in conducting accreditation inspections and training for Federation of Net-centric Sites (FaNS) locations.</p> <p><b>FY 2022 Plans:</b> Provide CM functional and physical configuration management and change management to the CTSF Army Interoperability Certification test floor environment. Provide CM functional and physical configuration management and change management to the AICFB, to include archiving the required system software, data products and documentation, while correlating the relevant data within the CMTSIII DBMS for visibility to users Army wide. Provide baseline reconciliation to the four quarterly CIO/G6 AICFB reports, identifying to commanders and their G-3/G-6 staff the Army's AIC certified, Interoperability Capability and Limitations assessed, AIC waived, and AIC exempted system software that is authorized to connect to the Army's network. Assist the HQDA G-6 in conducting accreditation inspections and training for Federation of Net-centric Sites (FaNS) locations.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to leveraged efficiencies in contractor manpower utilization in support of mission execution.</p>				
<p><b>Title:</b> Management Operations/Program Office</p> <p><b>Description:</b> Provide management operations consisting of planning, programming and executing funds; planning and programming for required personnel; planning, programming and executing contracts supporting AIC testing processes; identifying reimbursable tests and collecting/allocating appropriate funds; planning and programming logistics activities, managing/controlling/documenting physical assets and inventories; and perform oversight and coordination of physical security with hosting installation.</p> <p><b>FY 2021 Plans:</b> Program and execute funding. Plan and program manpower, identify contracting requirements and develop strategy for implementation in conjunction with CECOM Acquisition Center. Track testing schedule, prepare/coordinate/track customer</p>		0.732	0.385	0.370

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>funding for AIC testing activities and infrastructure support. Continue to provide field support coordination for unit training and exercises upon request. Maintain existing infrastructure while transitioning to permanent facility; continue to enhance physical security, access control, force protection, COOP and EAP activities and exercises. Continue inventory accountability programs and asset control.</p> <p><b>FY 2022 Plans:</b> Program and execute funding. Plan and program manpower, identify contracting requirements and develop strategy for implementation in conjunction with CECOM Acquisition Center. Track testing schedule, prepare/coordinate/track customer funding for AIC testing activities and infrastructure support. Continue to provide field support coordination for unit training and exercises upon request. Maintain existing infrastructure; continue to enhance physical security, access control, force protection, Continuity Of Operations (COOP) and Emergency Action Plan (EAP) activities and exercises. Continue inventory accountability programs and asset control.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease due to reduction in TDY/Training costs and reduction in ISSA cost related to reduction in total square footage for CTSF.</p>				
<p><b>Title:</b> Modernization</p> <p><b>Description:</b> Technical modernization FY22-23 effort for Army Interoperability Certification (AIC) to enhance CTSF testing capabilities. Estimated cost of modernization is approximately \$6M in investment with virtualization efforts and test automation. Funding provided for hardware &amp; software integration for virtualization and automation, software licensing, and labor and other supporting integration efforts.</p> <p><b>FY 2021 Plans:</b> Implementation of AIC/CSTF Tiger Team forecasting efficiencies and determining requirements for FY22-23 virtualization and automation efforts.</p> <p><b>FY 2022 Plans:</b> Implementation of the automation and virtualization efforts to support the technical modernization of AIC testing. Funding provided for purchase of hardware &amp; software integration, virtualization and automation, software licensing and labor and other integration efforts.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase is due to approval and implementation of AIC testing modernization efforts.</p>		0.001	0.001	5.952
<b>Accomplishments/Planned Programs Subtotals</b>		8.406	6.981	11.438



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	<b>Project (Number/Name)</b> C29 / <i>Centralized Technical Support Facility (CTSF)</i>

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

**Remarks**

**D. Acquisition Strategy**

Transition from executing a single test event at a time to multiple simultaneous test events using new universal mission threads, providing speed and efficiency to the test/acquisition timeline. Execute system of systems interoperability testing and certification through the use of Government and Systems Engineering and Technical Analysis (SETA) contract personnel experienced in product development and interoperability testing. Testing and certification occurs in a cyclical fashion, with an expectation of an annual Software Block/Capability Set test followed with cyclical multiple test events to ensure integrity of software baselines to the Warfighter. Engineering Services provides strategic integration of software into a system of systems/family of systems environment to support interoperability testing. Establish and maintain Configuration Management and version control of the Army's Interoperable Battle Command LandWarNet Baseline. Distributed testing capability uses local assets and leverages other federated test facilities to create synergy and realize efficiencies.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)
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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			
MITRE Corp	FFRDC	Engineering Services : Fort Hood, TX	17.178	-		-		-		-		-	0.000	17.178	-
In-House	Allot	Engineering Services : Fort Hood, TX	2.548	-		-		-		-		-	0.000	2.548	-
<b>Subtotal</b>			19.726	-		-		-		-		-	0.000	19.726	N/A

<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			
CECOM Matrix	Allot	Program and Budget Analysis Support : Fort Hood, TX/ Aberdeen Proving Grounds, MD	5.223	0.482		0.142		0.145		-		0.145	0.000	5.992	-
In-House Support	Allot	Management Operations, Logistics Support : Fort Hood, TX	9.928	-		-		-		-		-	0.000	9.928	-
ISSA/Training/TDY	Allot	Site Support Activities : Fort Hood, TX	0.557	0.230		0.180		0.160		-		0.160	0.000	1.127	-
Supplies	C/UCA	Management Operations, Logistics Support : Fort Hood, TX	1.495	0.020		0.063		0.065		-		0.065	0.000	1.643	-
Moving Costs	Allot	Management Operations, Logistics Support : Fort Hood, TX	-	0.001		0.001		0.001		-		0.001	0.000	0.003	-
<b>Subtotal</b>			17.203	0.733		0.386		0.371		-		0.371	0.000	18.693	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)
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<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			

**Remarks**  
Under "open-the-door" cost model, all In-house support efforts are included under Test & Evaluation.

<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			
CECOM RS3	C/CPFF	Test, Configuration Management : Fort Hood, TX	14.654	4.090	May 2020	3.547	Sep 2021	2.539	Sep 2022	-		2.539	0.000	24.830	-
CECOM GSA BMO SB SITE SUPPORT SERVICES	C/T&M	Facilities, Maintenance, Security : Fort Hood, TX	11.453	1.218	Aug 2020	1.328	Sep 2021	1.354	Sep 2022	-		1.354	0.000	15.353	-
ISSA	MIPR	Utilities & NEC Support : Fort Hood, TX	4.945	-		-		-		-		-	0.000	4.945	-
ARL Matrix	MIPR	Test : Fort Hood, TX	6.374	-		-		-		-		-	0.000	6.374	-
In-House Support	Allot	Test : Fort Hood, TX	10.243	2.358		1.712		1.214		-		1.214	0.000	15.527	-
Instrumentation	C/UCA	Test Equipment Infrastructure : Fort Hood, TX	3.191	0.006		0.007		0.008		-		0.008	0.000	3.212	-
Virtualization	MIPR	Test, Configuration Management : Fort Hood, TX	1.091	0.001	Feb 2021	0.001	Feb 2021	5.952		-		5.952	0.000	7.045	-
<b>Subtotal</b>			51.951	7.673		6.595		11.067		-		11.067	0.000	77.286	N/A

**Remarks**  
ARL Matrix effort became a "reimbursable" effort under Open-the-Door cost model effective in FY17; no longer "Direct" funded.  
ISSA no longer funded at CTSF level.



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)

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
20.1 Universal Test Environment AIC Test event		■																										
Baseline Updates 3rd QTR FY20			■																									
20.2 Universal Test Environment AIC Test event				■																								
Baseline Updates 1st QTR FY21				■																								
21.1 Universal Test Environment AIC Test event						■																						
Baseline Updates 3rd QTR FY21							■																					
21.2 Universal Test Environment AIC Test event								■																				
Baseline Updates 1st QTR FY22											■																	
22.1 Universal Test Environment AIC Test event										■																		
Baseline Updates 3rd QTR FY22												■																
22.2 Universal Test Environment AIC Test event														■														
Configuration Management (CM)	■				■				■				■				■				■							
	Configuration Management (continuous)				Configuration Management (continuous)				Configuration Management (continuous)				Configuration Management (continuous)				Configuration Management (continuous)				Configuration Management (continuous)							
Engineering Services (ES) Test and Integration	■				■				■				■				■				■							
	Test Engineering & Integration (continuous)				Test Engineering & Integration (continuous)				Test Engineering & Integration (continuous)				Test Engineering & Integration (continuous)				Test Engineering & Integration (continuous)				Test Engineering & Integration (continuous)							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C29 / Centralized Technical Support Facility (CTSF)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
20.1 Universal Test Environment AIC Test event	2	2020	2	2020
Baseline Updates 3rd QTR FY20	2	2020	3	2020
20.2 Universal Test Environment AIC Test event	4	2020	4	2020
Baseline Updates 1st QTR FY21	4	2020	1	2021
21.1 Universal Test Environment AIC Test event	2	2021	2	2021
Baseline Updates 3rd QTR FY21	2	2021	3	2021
21.2 Universal Test Environment AIC Test event	4	2021	4	2021
Baseline Updates 1st QTR FY22	4	2021	1	2022
22.1 Universal Test Environment AIC Test event	1	2022	2	2022
Baseline Updates 3rd QTR FY22	2	2022	3	2022
22.2 Universal Test Environment AIC Test event	3	2022	4	2022
Configuration Management (CM)	1	2019	4	2022
Engineering Services (ES) Test and Integration	1	2019	4	2022

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng			
<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>
C34: Army Tac C2 Sys Eng	-	9.092	9.351	11.473	-	11.473	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project C34, Army Tactical Command and Control Systems Engineering supports the Army's Network Modernization Strategy. Project C34 coordinates technical efforts across and outside of PEO C3T to ensure integration with the current and future Mission Command Network. Project C34 provides technical support for programs aligned and in support of Network CFT LOEs 1 through 4 (Unified Network, Common Operating Environment, Interoperability, and Command Post Mobility & Survivability) that informs the design and solutions with specific emphasis on the ability for the different efforts to be integrated and interoperable with one another. Efforts support the Network CFT capability set strategy.

Project C34, Army Tactical Command and Control Systems Engineering: This project funds the PEO Command, Control, Communications-Tactical (PEO C3T) System of Systems engineering and integration, experimentation, acquisition management, testing, fielding and sustainment support to ensure interoperability and affordability within the PEO C3T portfolio. The effort focuses on System-of-Systems (SoS) Engineering and Integration for the Mission Command Network with increased emphasis on immediate Warfighter needs as well as leveraging emerging technologies.

Fiscal Year 2022 will focus on the continued development, implementation and integration of the Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) network architectures. This includes maturing the technology enhancement roadmap for SoS capability evolution across the PEO C3T portfolio that incorporates Cross Functional Team initiatives; network integration support and design products for system validation through various N-CFT lead experimentation and integration testing; integration of tactical networked capabilities for all Mission Command Network systems and integration events; integration of tactical information assurance solutions and security measures for consistent cyber protection; and support to N-CFT evaluations.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Mission Command Network Synchronization and Integration Support	0.084	0.144	0.381
<b>Description:</b> Funds are for the following effort:			
<b>FY 2021 Plans:</b> Continue the support of current force and the development of future force C5ISR across the tactical network to ensure all Assistant Secretary of the Army (Acquisition, Logistics & Technology) (ASA(ALT)) programs are synchronized and redundancies and overlapping capabilities are reduced across the network and in synchronization with Common Operating Environment.			
<b>FY 2022 Plans:</b> Continue the support of current force and the development of future force C5ISR across the tactical network to ensure all Assistant Secretary of the Army (Acquisition, Logistics & Technology) (ASA(ALT)) programs are synchronized and redundancies			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
and overlapping capabilities are reduced across the network and in synchronization with Army Modernization priorities and Cross Functional Team activities.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase funding supports additional work for Army Modernization priorities.				
<b>Title:</b> Developmental Test and Integration Test Support between Programs of Record (PORs) and platforms / Command Posts (CPs) to execute System-of-Systems (SoS) and Interoperability		1.357	1.399	1.979
<b>Description:</b> Funds support the following effort:				
<b>FY 2021 Plans:</b> Continue to mature/revise the design, configuration and establishment of the system of systems integration test infrastructure architecture and implementation. Continue to provide the infrastructure and support in conducting integration testing and systems engineering for C3T non-program of record and program of record systems, products, technical insertions, and systems under evaluation to ensure integration of capabilities across the network. Maintain support of COE risk reduction testing. Continue the design and coordination of integration testing across the Mission Command Network systems.				
<b>FY 2022 Plans:</b> Continue to mature/revise the design, configuration and establishment of the system of systems integration test infrastructure architecture and implementation. Continue to provide the infrastructure and support in conducting Integration testing and systems engineering for C3T systems, products, technical insertions, and systems under evaluation to ensure integration of capabilities across the network. Develop integration testing tools designed to enhance DEVSECOPS implementation and more expeditious testing cycles. Expand infrastructure and support to establish and maintain an AIC FaNS facility.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase funding to improve DEVSECOPS integration testing and AIC FaNs.				
<b>Title:</b> Tactical Network Engineering		0.752	0.803	0.843
<b>Description:</b> Funds support the following efforts:				
<b>FY 2021 Plans:</b> Develop effective engineering strategies to integrate tactical applications for use across the C3T enterprise network. Continue to perform network planning and integration activities across all cross-domain system-of-systems future capabilities and technologies.				
<b>FY 2022 Plans:</b>				



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Develop effective engineering strategies to integrate tactical applications for use across the Mission Command network. Continue to perform network planning and integration activities across all cross-domain system-of-systems future capabilities and technologies. Develop or support development of networking documentation that defines integration of evolving Capability Set systems.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to inflation.</p>				
<p><b>Title:</b> Conduct and Support System Interoperability Engineering and Development of System-of-Systems (SoS) Architectural Products</p> <p><b>Description:</b> Funds support the following efforts:</p> <p><b>FY 2021 Plans:</b> Within the PEO C3T portfolio and in conjunction with N-CFT activities, continue to assess Emerging Technologies, identify critical integrated test points, monitor developmental testing at integration points, develop architectural data processes and products, and facilitate the transition of Network capabilities to the warfighter.</p> <p><b>FY 2022 Plans:</b> Within the PEO C3T portfolio and in conjunction with N-CFT activities, continue to assess Emerging Technologies, identify critical integrated test points, monitor developmental testing at integration points, develop architectural data processes and products, and facilitate the transition of Network capabilities to the warfighter. Provide technical support to exercises and demonstrations of Army modernization initiatives such as Mission Partner Environment SEC/REL implementation and AFC Project Convergence.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase funding supports additional DoD and Army Modernization experimentation and demonstrations.</p>		1.766	1.803	2.451
<p><b>Title:</b> Development and Implementation of Tactical Information Assurance (IA)</p> <p><b>Description:</b> Funds support the following efforts:</p> <p><b>FY 2021 Plans:</b> Will continue to implement ARCYBER, CIO/G6 and CYBERCOM guidance for execution of Information Assurance policies and procedures at the tactical level. Continue to document the current tactical IA network architecture with the goal of developing recommendations to eliminate inconsistencies/duplications, increasing the security posture, decreasing complexity of operations, and decreasing costs. Continue to plan and design security measures and IA requirements across the tactical network for future capabilities.</p> <p><b>FY 2022 Plans:</b></p>		0.214	0.273	0.286

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Will continue to implement ARCYBER, CIO/G6 and CYBERCOM guidance for execution of Information Assurance policies and procedures at the tactical level. Continue to document the current tactical IA network architecture with the goal of developing recommendations to eliminate inconsistencies/duplications, increasing the security posture, decreasing complexity of operations, and decreasing costs. Continue to plan and design security measures and IA requirements across the tactical network for future capabilities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to inflation.</p>				
<p><b>Title:</b> System of Systems Development</p> <p><b>Description:</b> Funds support the following efforts:</p> <p><b>FY 2021 Plans:</b> Continue to effectively manage overall System-of-Systems Engineering, Enterprise, and Integration efforts for the PEO C3T portfolio of technology and capability enhancement programs. Continue to conduct SoS engineering design for capabilities planned to field in FY 2021, FY 2022 and FY 2023 to include Program of Record and emerging LOE technologies.</p> <p><b>FY 2022 Plans:</b> Continue to effectively develop technical implementation of overall System-of-Systems Engineering, Enterprise, and Integration efforts for the PEO C3T portfolio of technology and capability enhancement programs. Continue to conduct SoS engineering design for capabilities planned to field in FY 2023 and FY 2025 to include Program of Record and emerging LOE technologies.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to inflation.</p>		3.233	3.201	3.362
<p><b>Title:</b> System of Systems (SoS) Engineering and Integration Evolution of the Network</p> <p><b>Description:</b> Funds support the following efforts:</p> <p><b>FY 2021 Plans:</b> In Conjunction with LOE and CFT efforts, continue to implement cross PEO System of Systems Engineering and Integration processes, analysis and S&amp;T coordination to ensure successful development Engineering and Testing of current and future systems. Continue to develop streamlined processes to support ASA(ALT) OCE and implement Value Engineering (VE) and Lean Six Sigma initiatives across all PEO C3T capabilities to include the Mission Partner Environment.</p> <p><b>FY 2022 Plans:</b> In Conjunction with LOE and CFT efforts, continue to implement cross PEO System of Systems Engineering and Integration processes, analysis and S&amp;T coordination to ensure successful development Engineering and Testing of current and future</p>		1.686	1.728	2.171

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
systems. Continue to develop streamlined processes to support AFC and ASA(ALT) OCSE SE strategy. Develop solutions to address technical configuration management challenges introduced by CS baselines and DEVSECOPS strategies.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Increase funding to implement improved configuration management engineering tools to mitigate capability set pace.			
<b>Accomplishments/Planned Programs Subtotals</b>	9.092	9.351	11.473

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

**Remarks**  
Not applicable for this item.

**D. Acquisition Strategy**  
This project provides the technical and programmatic disciplines required for systems engineering and integration, experimentation, acquisition management, testing, interoperability, support to fielding and sustainment. It will focus on System-of-Systems (SoS) Systems Engineering and Integration for the tactical network with increased emphasis on immediate Warfighter needs as well as leveraging emerging technologies. Efforts align to support the acquisition strategies of the programs that must connect to the network.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				C34 / Army Tac C2 Sys Eng							
Product Development (\$ in Millions)				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
System of System Engineering & Integration, Current & Strategic Initiative, Architecture Integration	C/CPFF	Bowhead : APG MD	2.750	3.850	Dec 2019	3.907	Nov 2020	1.900	Nov 2021	-		1.900	Continuing	Continuing	Continuing
Systems Engineering Support	Various	Various : APG, MD	4.068	0.732	Oct 2019	0.790	Oct 2020	6.901	Oct 2021	-		6.901	Continuing	Continuing	Continuing
System of System Architectures, Engineering, and Integration	SS/FP	MITRE : Aberdeen Proving Ground, MD/ Eatontown, NJ	103.081	4.148	Sep 2020	4.172	Oct 2020	2.180	Oct 2021	-		2.180	Continuing	Continuing	Continuing
<b>Subtotal</b>			109.899	8.730		8.869		10.981		-		10.981	Continuing	Continuing	N/A
Support (\$ in Millions)				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
MATRIX	MIPR	CERDEC : Aberdeen Proving Ground, MD	14.102	0.362		0.482		0.492		-		0.492	Continuing	Continuing	Continuing
<b>Subtotal</b>			14.102	0.362		0.482		0.492		-		0.492	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			124.001	9.092		9.351		11.473		-		11.473	Continuing	Continuing	N/A
<b>Remarks</b>															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng

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				
Mission Command Network S&T									[Bar]				[Bar]																			
S&T Synchronization: Oversee PM Transition Status													[Bar]				Oversee PM Transition Status															
S&T Synchronization: Develop S&T Gaps & Review																	[Bar]				Develop S&T Gaps & Review											
S&T Synchronization: Develop PM Plans / POM Initiatives																	[Bar]				Develop PM Plans / POM Initiatives											
S&T Synchronization- Oversee PM Transition Status																					[Bar]				Oversee PM Transition Status							
S&T Synchronization Develop S&T Gaps & Review																					[Bar]				Develop S&T Gaps & Review							
S&T Synchronization- Develop PM Plans / POM Initiatives																					[Bar]				Develop PM Plans / POM Initiatives							
Analysis Network Analysis																	[Bar]				Network Analysis											
System of Systems System Engineer, Integration, and Development																	[Bar]				[Bar]				[Bar]				[Bar]			
System of System Solutions CS21																	[Bar]				[Bar]											
SoS CDR					▲ CDR																											
System of Systems Solutions CS23													[Bar]				[Bar]															
SoS PDR									▲ PDR																							



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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> C34 / Army Tac C2 Sys Eng

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mission Command Network S&T	1	2022	4	2023
S&T Synchronization: Oversee PM Transition Status	1	2022	4	2022
S&T Synchronization: Develop S&T Gaps & Review	2	2022	3	2022
S&T Synchronization: Develop PM Plans / POM Initiatives	3	2022	4	2022
S&T Synchronization- Oversee PM Transition Status	1	2023	4	2023
S&T Synchronization Develop S&T Gaps & Review	2	2023	3	2023
S&T Synchronization- Develop PM Plans / POM Initiatives	3	2023	4	2023
Analysis Network Analysis	1	2022	4	2023
System of Systems System Engineer, Integration, and Development	1	2021	4	2026
System of System Solutions CS21	1	2022	1	2023
SoS CDR	2	2021	2	2021
System of Systems Solutions CS23	1	2023	1	2024
SoS PDR	2	2022	2	2022
System of Systems Solutions CS25	1	2024	1	2025
SoS CDR	2	2023	2	2023
System of System Integration Risk Reduction	1	2022	4	2023
Integration Test Support SoS RR	1	2022	1	2022
Integration Test Support SoS RR	3	2022	4	2022
Integration Test Support SoS RR	3	2023	4	2023

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)			
<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>
EJ4: COMMAND POST COMPUTING ENVIRONMENT (CPCE)	-	29.694	26.485	35.117	-	35.117	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This funding line is directly aligned to the Network-Cross Functional Team's Army Network Modernization Strategy Line of Effort (LOE) 2, Common Operating Environment (COE).

Command Post Computing Environment (CPCE) implements an integrated, interoperable, cyber-secure, software infrastructure that serves as the host for a unified set of multiple warfighting functional applications within the command post at all echelons (Battalion to Army Service Component Commander); eliminating "stove-piped" legacy systems, duplicative or redundant implementations, simplifying future application development efforts, and enhancing interoperability and data sharing across multiple echelons.

The CPCE software infrastructure and applications reside on Tactical Server Infrastructure (TSI) hardware and previously fielded BCCS/TSI servers. CPCE/TSI provides the hardware infrastructure to host capabilities, such as movement and maneuver applications, network enabling tools (i.e. Cyber Situational Understanding and Tactical Defensive Cyber Operation Infrastructure) and warfighting function applications. This software infrastructure provides the Army's premier Common Operating Picture (COP) solution, allowing interoperability between command posts, mounted platforms, and dismounted handheld devices while supporting collaboration with Joint and Unified Action partners. CPCE provides common look and feel (user interface), common data strategy, interoperable tactical messaging/ chat, and essential movement and maneuver capabilities.

FY 2022 funding will extend the capabilities of the CPCE software infrastructure, and support Capability Set 23 (CS23). CPCE Increment 2 will bring additional warfighting function capabilities, and is focused primarily on the convergence of existing command post systems managed by Army programs of record. Warfighting functions and systems planned for convergence in Increment 2 include Intel, Fires, and Aviation systems. Improvements to the CPCE infrastructure to accommodate legacy system integration will also be required. Additionally, as part of Increment 2 and CS23, multiple Science and Technology efforts will reach Technology Readiness Level 6 and will be integrated and tested for inclusion into the CPCE architecture. Continued RDTE efforts will include ongoing development in the area of data, from ingesting of feeds, to persistence (storage) of data and querying.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> SW Dev - Core Infrastructure	21.253	16.477	25.402
<b>Description:</b> Provides a core software infrastructure that underpins an integrated mission command capability in command posts, from Army Service Component Command (ASCC) to Battalion echelons that provides simplicity, intuitiveness, core services			



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>and applications, common look and feel, and warfighter functionality in the areas of Fires, Logistics, Intelligence, Airspace Management and Maneuver. Primary software development efforts include enhancement of the Common Operating Picture (COP), a Common Geospatial solution (map), a user interface with "common look and feel," common Data Services (including an extensible database and data persistence), tactical messaging and translation, and backwards compatibility to previously fielded legacy systems. Software development efforts focus on designing the system to reduce the training burden on the Soldier, and the creation of an Integrated Software Development Kit (ISDK) that allows external developers the ability to integrate new capabilities without rebuilding common components.</p> <p><b>FY 2021 Plans:</b> Continue to facilitate legacy system capability convergence, incorporate new Commercial off the shelf (COTS) and Government-developed capabilities into the CPCE infrastructure. Development and integration of new capabilities and features including additional movement and maneuver functions, engineer functions, Infrastructure modification/improvement to support legacy system capability convergence, CPCE Capability Drop 1 (CD1) requirements, Cross-Cutting Capabilities (CCC) enhancements and enhancements for Movement and Maneuver.</p> <p><b>FY 2022 Plans:</b> For FY22, CPCE Increment 2 efforts focus on warfighting function / legacy system convergence and the implementation and integration of emerging Science &amp; Technology (S&amp;T) efforts. Convergence during FY22 will focus on Intel, Fires, and Aviation capabilities. Specific S&amp;T efforts include Geospatially-Enabled Operational Design (GEOD), Automated Analytics for the Operational Environment (A2OE), Rainmaker, and Information Trust. Additionally ongoing development of the movement and maneuver functions and core infrastructure improvements continue in support of Capability Set 23. This includes continued integration of the latest commercial software solutions and updates.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase is due to increased integration effort required to converge multiple warfighting functions and legacy systems into CPCE. As CPCE Inc 0 and Inc 1 developed the underlying framework for convergence, Inc 2 (aligned with CS23) will require increased support in the areas of development, system architecture design, and testing to ensure additional capabilities and multiple S&amp;T efforts converge effectively, allowing future system divestment decisions.</p>				
<b>Title:</b> Hardware/Software Integration		2.813	2.823	3.180
<b>Description:</b> Hardware / Software Integration within CPCE/TSI consists of research, development, and engineering efforts required to select, engineer, and field a COTS hardware server and related components. The CPCE software resides on converged Tactical Server Infrastructure (TSI) server stacks, which host multiple software infrastructure components including Microsoft Exchange, SharePoint, Defensive Cyber Operations (DCO) tools, SQL databases, Active Directory, and others. This				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>enterprise software is tightly-coupled with, and engineered for, specific TSI hardware using virtual machine (VM) technology and must serve as the basis for all other warfighting functions and mission command system software loaded on the server.</p> <p><b>FY 2021 Plans:</b> For FY 2021, efforts will continue to focus on design enhancements for the TSI server architecture to achieve further savings in size, weight, and power. Engineering efforts will continue to refine the automated server provisioning and configuration tool that will allow rapid provisioning of new software capabilities and remote system querying and patching. Additional engineering effort will be required to ensure DCO tools are integrated and unique hardware requirements are accounted for. Engineering of Cyber Situational Understanding (SU) integration will begin.</p> <p><b>FY 2022 Plans:</b> For FY22, complete the updates to the CPCE Increment 1 hardware and software integration efforts. Integration will include incorporating progressive updates to the core software infrastructure, convergence of map based planning services and the aviation mission planning system into the CPCE software infrastructure.</p> <p>CPCE Increment 2 agile development and convergence efforts are in full effect during FY22. Integration of warfighter applications into the CPCE software and/or direct inject into the TSI hardware will be accomplished during this FY and continue through FY23, in order to meet Army Network Modernization Strategy goals for LOE 2, and Common Operating Environment functions.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase aligns with the expansion of the CPCE integration on the TSI servers to support current Army Network Modernization Strategy goals for LOE2 and Common Operating Environment functions.</p>				
<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Test and evaluation efforts include the planning and conduct of Command Post Computing Environment (CPCE) T&amp;E event including Developmental Test (DT), System Software Acceptance Testing (SSAT), Integration Events, Risk Reduction Events, and the Integrated Test Strategy and Operational Assessments.</p> <p><b>FY 2021 Plans:</b> In FY 2021, CPCE will conduct multiple developmental tests to support CPCE Increment 1 capabilities and features. CPCE software will also participate in Army Interoperability Certification (AIC) testing, and Operational Assessments to inform an Increment 1 fielding decision.</p> <p><b>FY 2022 Plans:</b></p>		3.085	4.687	4.112

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
CPCE/TSI will continue Developmental Testing (DT), System Software Acceptance Testing (SSAT), Integration Events, Risk Reduction Events, as part of the Integrated Test Strategy for the Increment 1 update, which is expected to be released in 4QFY22 to meet Army senior leaders' objectives of maintaining the latest software baseline in the field.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease aligns to reduced number of operational test events planned for FY22.			
<b>Title:</b> Program Management	2.543	2.498	2.423
<b>Description:</b> Program management includes overall management of program. Includes participation in program planning meetings and IPTs.			
<b>FY 2021 Plans:</b> Program office management in the areas of Technical, and Logistics remains a requirement in FY 2021. This support includes personnel covered by Functional Support Agreements between PM Mission Command and various Government support agencies such as the Army Research and Development Center (ARDEC), and Combat Capabilities Development Command (CCDC). Program Management efforts in the FY 2021 timeframe will also include management of all SW development, system engineering, exercise support, DT and Operational Assessment efforts.			
<b>FY 2022 Plans:</b> Program office management of engineering and logistics teams remains a requirement in FY 2022. This support includes personnel covered by Functional Support Agreements between PM Mission Command and various Government support agencies such as the Army Research and Development Center (ARDEC), and Combat Capabilities Development Command (CCDC).  Program Management efforts in the FY 2022 timeframe will also include management of all SW development, system engineering, exercise support, and testing.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding remains relatively constant from FY 2021 to FY 2022.			
<b>Accomplishments/Planned Programs Subtotals</b>	29.694	26.485	35.117

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2022</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• B70000: COE Tactical Server Infrastructure (TSI)	67.533	86.198	99.858	-	99.858	-	-	-	-	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**  
Related to CPCE is the Tactical Server Infrastructure (TSI) funding line, B70000, which funds computer hardware and software servers/hosting platforms for CPCE software.

**D. Acquisition Strategy**

CPCE/TSI is an Acquisition Category II program structured in increments to deliver capability every two years. Increment 1 aligns with Capability Drop (CD) 1 and Increment 2 will align with CD 2.

In accordance with DoD direction that procurement and modification of Commercial Off-the-Shelf (COTS) products is the preferred acquisition approach, CPCE/TSI procured a COTS battle management system to serve as the underlying core infrastructure, and is modifying that COTS product to meet additional Army requirements, including backwards compatibility with legacy systems. For development of additional capabilities to be integrated into the COTS system, CPCE/TSI follows the Agile development approach (Epics, Iterations, and Sprints) that allows capabilities to be engineered, developed and tested rapidly.

The Combat Capabilities Development Command (CCDC) Armaments Center Weapons and Software Engineering Center (WSEC) and the Communications-Electronics Command (CECOM) Software Engineering Center (SEC) are prime Government partners in system development. Commercial suppliers are assigned efforts through GSA Mission Command Engineering Services vehicles and Multiple Award Task Order (MATO) contracts.

Hardware (server) platforms are COTS and procured under the Tactical Services Infrastructure (TSI) funding line through existing vehicles from GSA, Common Hardware Systems (CHS) and the Army Computer Hardware Enterprise Software and Solutions (CHESS).

CPCE Inc 0 brings the core software infrastructure and initial movement and maneuver capabilities. Inc 1 will meet the requirements of the CPCE Requirements Definition Package and Capability Drop 1 and focuses on enhancements to Inc 0 and enabling legacy system convergence. Inc 2 will bring additional warfighting function capabilities and enhancements to existing capability.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PM Support (Gov't-Core)	Sub Allot	PM Mission Command : APG, MD	5.603	-		-		-		-		-	0.000	5.603	-
PM Support (Gov't-Matrix)	IA	Various Matrix Orgs incl CECOM SEC, ILSC, PRD, et al) : APG, MD	5.747	0.942		-		0.839	Oct 2021	-		0.839	Continuing	Continuing	-
PM Support (SETA Contractor)	C/FFP	Multiple incl CACI and others : APG, MD	18.101	1.601	Nov 2019	2.498	Nov 2020	1.584	Nov 2021	-		1.584	Continuing	Continuing	-
<b>Subtotal</b>			29.451	2.543		2.498		2.423		-		2.423	Continuing	Continuing	N/A

**Remarks**  
Funding for Core government support (Management and Oversight of CPCE/TSI) transitioned to OMA Appropriation in FY19. Funding remains relatively constant from FY21 to FY22.

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
System Requirements Engineering	Various	SW Dev Contractors and Multiple Matrix Orgs : Various Locations	23.831	-		-		-		-		-	0.000	23.831	-
Software Development - Core Infrastructure	Option/ Various	ARDEC, CCDC, Systematic : Picatinny, NJ APG, MD Centerville, VA	155.462	21.253	Oct 2019	16.477	Oct 2020	25.402	Nov 2021	-		25.402	Continuing	Continuing	-
Joint and Coalition Interoperability	Various	Multiple : Various	0.296	-		-		-		-		-	0.000	0.296	-
Hardware / Software Integration	IA	Various Matrix Orgs incl CECOM SEC, ARDEC, ILSC, PRD, et al) : APG Md	23.084	2.813	Oct 2019	2.823	Oct 2020	3.180	Dec 2021	-		3.180	Continuing	Continuing	-

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)
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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			
<b>Subtotal</b>			202.673	24.066		19.300		28.582		-		28.582	Continuing	Continuing	N/A

**Remarks**  
 Software Development efforts will be managed through a combination of PM Mission Command technical staff, Matrix Organizations (C5ISR CCDC, AMRDEC) and software development contractor firms (contracts and task orders to be determined and competed as necessary).  
 Increase in Software Development-Core Infrastructure is due to increased integration effort required to converge multiple warfighting functions and legacy systems into CPCE. As CPCE Inc 0 and Inc 1 developed the underlying framework for convergence, Inc 2 (aligned with CS23) will require increased support in the areas of development, system architecture design, and testing to ensure additional capabilities and multiple S&T efforts converge effectively, allowing future system divestment decisions.

<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			
Product Support	C/FFP	SSCI : Austin, TX	2.989	-		-		-		-		-	0.000	2.989	-
<b>Subtotal</b>			2.989	-		-		-		-		-	0.000	2.989	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			
Develop and Conduct Tests and Assessments	MIPR	Multiple Test Agencies : Multiple Locations (Primary APG)	15.894	3.085	Oct 2019	4.687	Oct 2020	4.112	Oct 2021	-		4.112	Continuing	Continuing	-
<b>Subtotal</b>			15.894	3.085		4.687		4.112		-		4.112	Continuing	Continuing	N/A

			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>			251.007	29.694	26.485	35.117	-	35.117	Continuing	Continuing	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

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
Integrate Program of Record Functionality	[Blue bar]																											
CPCE PoR Test & Integration	[Blue bar]																											
CPCE Increment 1 Design	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
CPCE Increment 1 Development & Integration	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
Developmental Test Increment 1	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
CPCE Increment 1 Operational Assessment	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
Fielding Decision Increment 1	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
CPCE Increment 2 Design	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
CPCE Increment 2 Development & Integration	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
Developmental Test Increment 2	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
CPCE Inc 2 CDR	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
CPCE Increment 2 Operational Assessment	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			
Fielding Decision Increment 2	[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]				[Blue bar]			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)

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				
CPCE Increment 3 Design																	Increment 3 Design															
CPCE Increment 3 Development & Integration																	Increment 3 Development & Integration															
Developmental Test Increment 3																	Developmental Test Increment 3															
CPCE Inc 3 CDR																	4												CPCE Inc 3 CDR			
CPCE Increment 3 Operational Assessment																	5												Increment 3 Operational Assessment			
Fielding Decision Increment 3																	5												Fielding Decision			



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ4 / COMMAND POST COMPUTING ENVIRONMENT (CPCE)
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**Schedule Details**

Events	Start		End	
	Quarter	Year	Quarter	Year
Integrate Program of Record Functionality	2	2019	4	2026
CPCE PoR Test & Integration	1	2018	4	2026
CPCE Increment 1 Design	3	2019	2	2020
CPCE Increment 1 Development & Integration	2	2020	4	2021
Developmental Test Increment 1	3	2020	3	2021
CPCE Increment 1 Operational Assessment	3	2021	4	2021
Fielding Decision Increment 1	4	2021	4	2021
CPCE Increment 2 Design	4	2021	3	2022
CPCE Increment 2 Development & Integration	3	2022	4	2023
Developmental Test Increment 2	3	2022	3	2023
CPCE Inc 2 CDR	1	2023	1	2023
CPCE Increment 2 Operational Assessment	3	2023	4	2023
Fielding Decision Increment 2	4	2023	4	2023
CPCE Increment 3 Design	4	2023	3	2024
CPCE Increment 3 Development & Integration	3	2024	4	2025
Developmental Test Increment 3	3	2024	3	2025
CPCE Inc 3 CDR	1	2025	1	2025
CPCE Increment 3 Operational Assessment	3	2025	3	2025
Fielding Decision Increment 3	4	2025	4	2025

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)			
<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>
EJ5: MOUNTED COMPUTING ENVIRONMENT (MCE)	-	10.033	9.994	21.874	-	21.874	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This funding line is directly aligned to the Army Network Modernization Strategy LOE 2, Common Operating Environment (COE). PdM efforts are aligned to support the Network-Cross Functional Team (N-CFT) Capability Set approach to achieve the Army's Network Modernization Strategy.

The Mounted Computing Environment (MCE) supports N-CFT LOE 2 by providing:

- Critical Interoperability features that bridge the communications gap between the Command Post Computing Environment (CPCE) and Mobile Handheld Computing Environment (Nett Warrior)
- Data mediation, message format translation, and waveform exchanges across all CEs delivering improved information dissemination
- Mounted Common Operating Picture (COP) data sources, shared blue / red situational awareness, and Position / Location Information across the CEs
- Common, reusable services that enable Warfighting Function (WfF) convergence for rapid capability development and delivery with reduced costs for external PORs
- Mounted platform data sensor collection, processing, and disbursement applications that enable and enhance WfFs on the battlefield
- Foundational Cross-Cutting Capabilities (CCCs) that integrate with Joint C5ISR and strike capabilities

The MCE, which is one of six Computing Environments (CE) under the COE, internally develops and hosts applications (apps) developed by programs external to Project Manager Mission Command (PM MC) to provide robust WfF capabilities. MCE RDTE funding is executed to develop Mounted Mission Command-Software (MMC-S) (described below) to enable these convergence efforts.

Requirements for MMC-S (MCE) are established in the Army Requirements Oversight Council (AROC)-approved COE Information Systems Initial Capability Document (IS ICD) and the MCE Requirements Definition Package (RDP). MMC-S will support the next-generation network, transceiver, and more mature cross-Computing Environment (CE) interfaces.

At the Materiel Development Decision (MDD) review, the Milestone Decision Authority (MDA) signed an Acquisition Decision Memorandum (ADM) in June 2020 designating MMC-S as an ACAT II program of record (POR) under the MCE RDP.

MMC-S employs a Developmental Operations (DevOps) process to incrementally develop capability to satisfy Warfighter requirements and inform fielding decisions. DevOps activities will incorporate new capabilities and enhancements driven by the RDP and based on user feedback. Furthermore, MMC-S will provide the foundation to support third-party application convergence onto the MMC-S baseline. MMC-S utilizes the Android Tactical Assault Kit (TAK), which is a geospatial infrastructure and military situational awareness application that allows for precision targeting, surrounding land formation intelligence, situational awareness, navigation, and data sharing.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)
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FY 2022 funding supports the continued development of the MMC-S baseline, version 3.1, for a Limited User Test (LUT) and Army Interoperability Certification (AIC) culminating in a Limited Deployment Decision in 4QFY22. Furthermore, FY 2022 funding begins the second phase of MMC-S development, version 3.2, and implementation of new capabilities to support additional networks and bolster cross-Computing Environment (CE) interfaces. These efforts are aligned to Capability Set 23.

MCE RDTE (project EJ5) resources are used for MCE (MMC-S) software development, while JBC-P RDTE is used to improve JBC-P hardware, network performance, and resiliency.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Software Development</p> <p><b>Description:</b> MMC-S provides an integrated mission command capability across Platforms, through all echelons, delivering simplicity, intuitiveness, core services and applications, a common look and feel, and functionality across all Warfighting Functions (WfF); Fires, Logistics, Intelligence, and Maneuver. Software development is focused on enhanced situational awareness functions, cross-cutting data exchange services, and Mission Command applications displayed on the next-generation common geospatial solution [map] through a graphical user interface that delivers a "common look and feel" across the CEs.</p> <p><b>FY 2021 Plans:</b> Continued development and incorporation of baseline capabilities of MMC-S version 3.1 focused on infrastructure, core utilities, backwards compatibility, and WfF application convergence into a holistic system of systems, while ensuring subsystems function together in accordance with program requirements, specifications, and interoperability requirements. MMC-S will develop initial 3rd Party Apps; initial Sustainment WfF capabilities; Over-the-Air (OTA) updates for software patches, Information Assurance (IA), and maps; message standards migration; network path diversity for Commercial Solutions for Classified (CSfC), Wi-Fi, and Iridium satellite communications; Automated Primary, Alternate, Contingency, and Emergency (APACE) data mapping; Assured-Position/Navigation/Timing (A-PNT), anti-jam, and spoofing resilient Global Positioning System (GPS); and route planning and navigation.</p> <p><b>FY 2022 Plans:</b> FY 2022 funding will continue development and incorporation of baseline capabilities of MMC-S version 3.1 focused on infrastructure, core utilities, backwards compatibility, and WfF application convergence into a holistic system of systems, while ensuring subsystems function together in accordance with program requirements, specifications, and interoperability requirements. These efforts require extensive development of complex capabilities to ensure robust features are delivered to the Warfighter.</p> <p>FY 2022 funding will begin development of the next SW version, MMC-S version 3.2, that will focus on multiple platforms and programs such as: Platform Integration (Stryker, JLTV, Abrams, Bradley, AMPV), Sensor Integration (Long-Range Acquisition System (LRAS), Improved Target Acquisition System (ITAS), Fire-Support Sensor System (FS3), Netted Lethality Upgrades, Precision Fires - Mounted Integration, finalize OTA Updates (Over The Network Keying (OTNK), Map Updates), Remote Display,</p>	7.294	9.137	15.357

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Improved Route Planning / Navigation, Network Path Diversity (Smart Routing / APACE), additional 3rd Party Application Integration, Message Standards Migration, Netted asset (Non A-PNT), and VICTORY migration.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase supports completion of MMC-S version 3.1 and begins development of version 3.2, which encompasses more complex feature development and integration efforts. Version 3.2 is focused on convergence efforts with multiple platforms, platform data collection sensors, and complex interoperability requirements.				
<b>Title:</b> Software/Systems Engineering  <b>Description:</b> Perform Software and Systems Engineering (SE) in support of the development of MMC-S (MCE) capabilities, applications and services, to include, but not limited to, executing engineering studies, software architecture development, system analysis, technical readiness assessments, technical exchange meetings and events, and development of related reports and deliverables described in the MCE RDP. SEs will coordinate the development of common infrastructure components with CPCE and M/HHCE to define and incorporate the COE cross-cutting capabilities.  <b>FY 2021 Plans:</b> In FY 2021, MMC-S will execute required version 3.1 systems engineering activities, integration of 3rd party Program of Record (PoR) applications onto the baseline software architecture, focused on supporting MMC-S delivery to the Army's wheeled platforms (applique). MMC-S will execute DevOps with Army units in order to receive user feedback and inform MMC-S maturation. This Soldier (user) feedback will help shape future software development efforts to ensure the best capability is delivered to the Warfighter.  <b>FY 2022 Plans:</b> In FY 2022, MMC-S will continue required version 3.1 systems engineering activities, and begin version 3.2 SE activities to integrate 3rd party PoR applications onto the baseline software architecture, and platform integration onto the Army's wheeled platforms. MMC-S will continue DevOps with Army units in order to receive user feedback on MMC-S versions 3.1 and 3.2 to inform software development, refinement, and inform fielding decisions. SE activities will directly support MMC-S version 3.1's LUT and AIC to inform the LDD in support of CS23.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase supports MMC-S version 3.1 completion and inception of version 3.2, focused on convergence efforts with multiple platforms, platform data collection sensors, and complex interoperability requirements. Version 3.2 requires significant software and systems engineering efforts to ensure these complex features are developed and delivered to the Warfighter.		0.617	0.058	0.675
<b>Title:</b> Test and Evaluation		1.058	0.065	4.925

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Description:</b> Test and evaluation (T&amp;E) efforts consist of planning and execution for required test events to inform fielding decisions and ensure the safe delivery of capability to the Warfighter. T&amp;E events include: Development Operations (DevOps), Developmental Tests (DT), Software Assurance Tests, CS23 Integration Events, Risk Reduction Tests, Limited User Test (LUT), Army Interoperability Certification (AIC) , Security Control Assessment-Validation, and Initial Operational Test and Evaluation (IOT&amp;E).</p> <p><b>FY 2021 Plans:</b> In FY 2021, MMC-S will utilize DevOps to enhance the MMC-S baseline to meet Warfighter requirements. MMC-S will integrate existing 3rd party Programs of Record (PoR) applications onto the common MMC-S baseline. MMC-S will execute required Developmental Tests, Software Assurance Tests, CS23 Integration Events, Risk Reduction Tests, and Security Control Assessment-Validation tests in preparation for required FY22 Test activities to inform fielding decisions.</p> <p><b>FY 2022 Plans:</b> MMC-S will execute an MMC-S version 3.1 Limited User Test (LUT), to measure effectiveness, suitability, and survivability and provide an Adversary Assessment (AA) report to support the MMC-S v3.1 Software Materiel Release (SMR) review in 3Q23. The Army Interoperability Certification (AIC) will be executed to certify that MMC-S is interoperable and integrated with other systems on the tactical network. Both the LUT and AIC are required prior to the Limited Deployment Decision (LDD) in 4QFY22. MMC-S will execute version 3.2 DevOps events to inform development efforts. In addition, version 3.1 CS23 Integration Events will inform the v3.1 LDD and the development of MMC-S v3.2 DevOps plans. MMC-S will utilize DevOps to enhance the MMC-S baseline to meet Warfighter requirements. Resources will support required instrumentation Verification, Validation, and Accreditation (VV&amp;A) activities in preparation for the FY23 version 3.1 IOT to inform FDD.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase supports MMC-S v3.1 LUT, AIC, IOT preparation activities, and MMC-S v3.2 integrated-platform DevOps events.</p>				
<p><b>Title:</b> PM Support (Matrix &amp; Contractor)</p> <p><b>Description:</b> Program management includes overall management of program execution, major text events, reporting, technical support, and logistical support. Includes participation in program planning meetings, Integrated Project Teams, Technical Exchange Meetings, stakeholder management, 3rd party application convergence, and Science and Technology efforts and convergence. These efforts are continuous for the life of the program. They are not tied to specific versions of MMC-S.</p> <p><b>FY 2021 Plans:</b> Technical area contract support includes system development and engineering changes to MMC-S, system analysis of Program of Record (PoR) systems and future systems for integration and convergence, technical readiness assessments, and stakeholder</p>		1.064	0.734	0.917

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>technical exchange meetings and events. This support includes the creation and implementation of Functional Support Agreements (FSAs) between PM Mission Command and various Government support agencies, such as the Combat Capabilities Development Command (CCDC) C5ISR (Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance) Center, and other PEOs (e.g. PEO GCS). Program Management efforts in FY 2021 include business area support to ensure funding and contracts are planned and available for SW development, system engineering, and test efforts.</p> <p><b>FY 2022 Plans:</b> Will continue to provide Technical area contract support includes system development and engineering changes to MMC-S, system analysis of Program of Record (PoR) systems and future systems for integration and convergence, technical readiness assessments, and stakeholder technical exchange meetings and events. This support includes the creation and implementation of Functional Support Agreements (FSAs) between PM Mission Command and various Government support agencies, such as the Combat Capabilities Development Command (CCDC) C5ISR (Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance and Reconnaissance) Center, and other PEOs (e.g. PEO GCS). Program Management efforts in FY 2021 include business area support to ensure funding and contracts are planned and available for SW development, system engineering, and test efforts.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase will support the highly-complex MMC v3.2 development and external stakeholder coordination and continue MMC v3.1 development, integration, and delivery to the Warfighter.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		10.033	9.994	21.874
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
<p>MCE is the Army's initiative to provide simple and intuitive Mission Command on-the-Move (MCoTM) and situational awareness down to the platoon level. It is standards based, protected, and supports incremental improvements and WfF app capability enhancements. MMC-S leverages existing JBC-P hardware and network, and is deployed as a SW only upgrade to replace JBC-P SW. The MMC-Software will exploit the MMC-Transport (BFT 3 network) and hardware capability-maturation, continuously enhancing capabilities, security, and network resiliency that outpaces adversarial countermeasures and threats. MMC-S provides a common user-experience that enables leaders to lead and fight their formations from anywhere on the battlefield. MMC-S serves as the data mediator between disparate CEs, the Command Post Computing Environment (CPCE) and the Mobile Handheld Computing Environment (Nett Warrior), enabling seamless Mission Command and Common Operating Picture (COP) generation across all three CEs.</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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	<b>Project (Number/Name)</b> EJ5 / <i>MOUNTED COMPUTING ENVIRONMENT (MCE)</i>
<p>MMC-S utilizes an incremental development approach, leveraging DevOps, to ensure capability is delivered quickly, satisfies requirements, and addresses Warfighter feedback. This agile development process injects enhancements into the baseline software, making it easier and faster to incorporate technological advances. The product office conducts commercial software assessments to determine applicability and suitability for inclusion in the MMC-S baseline.</p> <p>Software development increments and fielding decisions are agile and are programmatically aligned with the two-year Army Capability Sets within the five-year Requirements Development Package (RDP; i.e. - IT Box). MMC-S is developed in Capability Assessment Packages (CAP), which are small groupings of requirements and capability that are manageable, tailorable, and scalable to meet Warfighter needs. The CAPS are developed by the Lead Systems Integrator (LSI) in three to twelve month timeframes. Collections of CAPs form MMC-S Engineering Releases (ER) / Capability Drops (CDs), which build upon one another leading to a complete incremental release (i.e. version 3.1). Incremental releases will be fielded with the Army Capability Sets. LDD in 4QFY22 for Increment v3.1 is aligned to CS23. Full Deployment Decision (FDD) for MMC-S v3.1 is scheduled for 4QFY23. FDD for MMC-S v3.2 is scheduled for 4QFY24, aligned to CS25. FDD for MMC-S v3.3 is scheduled for 4QFY26, aligned to CS27.</p> <p>At the Materiel Development Decision (MDD) review, the Milestone Decision Authority (MDA) signed an Acquisition Decision Memorandum (ADM) in June 2020 designating MMC-S as an ACAT II program of record (POR) under the MCE RDP.</p>		

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
PM Support (Matrix & Contractor)	Various	PM Mission Command : Aberdeen Proving Ground, MD	4.600	1.064		0.734	Nov 2020	0.917	Nov 2021	-		0.917	Continuing	Continuing	-
<b>Subtotal</b>			4.600	1.064		0.734		0.917		-		0.917	Continuing	Continuing	N/A

**Remarks**  
Funding increase will support the highly-complex MMC v3.2 development and external stakeholder coordination and continue MMC v3.1 development, integration, and delivery to the Warfighter.

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Software Development	Various	PM Mission Cmd, Multiple Matrix Orgs and SW Dev Contractors : Aberdeen Proving Ground, MD	29.514	7.294		9.137	Dec 2020	15.357	Dec 2021	-		15.357	Continuing	Continuing	-
Software/Systems Engineering	Various	PM Mission Cmd, Multiple Matrix Orgs and SW Dev Contractors : Aberdeen Proving Ground, MD	20.923	0.617		0.058	Feb 2021	0.675	Nov 2021	-		0.675	Continuing	Continuing	-
<b>Subtotal</b>			50.437	7.911		9.195		16.032		-		16.032	Continuing	Continuing	N/A

**Remarks**  
FY 2021 to FY 2022 funding increase supports completion of MMC-S version 3.1 and begins development of version 3.2, focused on complex convergence efforts with multiple platforms, platform data collection sensors, and complex interoperability requirements.  
  
Also supports increased Software/Systems Engineering efforts to ensure robust features are delivered to the Warfighter.



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)
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Test and Evaluation (\$ in Millions)				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			
Test, Evaluation and Integration	MIPR	Multiple Test Agencies; Multiple Locations : Aberdeen Proving Ground, MD	7.869	1.058		0.065	Nov 2020	4.925	Nov 2021	-		4.925	Continuing	Continuing	-
<b>Subtotal</b>			7.869	1.058		0.065		4.925		-		4.925	Continuing	Continuing	N/A

**Remarks**  
FY 2021 to FY 2022 funding increase supports MMC-S v3.1 LUT, AIC, and MMC-S v3.2 integrated-platform DevOps events, as well as initial planning costs for the FY23 IOT.

	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>	62.906	10.033	9.994	21.874	-	21.874	Continuing	Continuing	N/A

**Remarks**

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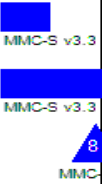
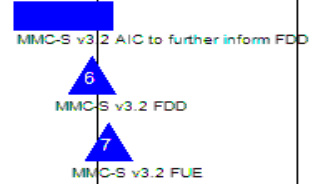
<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)

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			
MMC-S v3.1 Arch, System Engr & Development	[Redacted]																														
MMC-S v3.1 Systems Engineering (SE) & Development/DevOps	[Redacted]																														
MMC-S Materiel Development Decision (MDD) Briefing	1 ▲ MMC-S MDD																														
N-CFT's ITN 19 Experimentation Event	■ ITN 19 Event																														
MMC-S v3.1 Critical Design Review (CDR)									2 ▲ MMC-S v3.1 CDR																						
MMC-S v3.2 Arch, System Engr & Development	[Redacted]																														
MMC-S v3.2 SE & Development/DevOps	[Redacted]																														
MMC-S v3.1 Limited User Test (LUT)									■ MMC-S v3.1 LUT																						
MMC-S v3.1 Limited Deployment Decision (LDD)									3 ▲ MMC-S v3.1 LDD																						
MMC-S v3.1 Planned Initial Operational Test & Evaluation (IOT&E)													■ MMC-S v3.1 IOT&E																		
MMC-S v3.1 Planned Army Interoperability Certification (AIC) 2													■ MMC-S v3.1 AIC to further inform FDD																		
MMC-S v3.1 Full Deployment Decision (FDD)													4 ▲ MMC-S v3.1 FDD																		
MMC-S v3.1 First Unit Equipped (FUE)													5 ▲ MMC-S v3.1 FUE																		
MMC-S v3.2 Planned Operational Test (OT)																	■ MMC-S v3.2 Planned OT														
MMC-S 3.3 Arch, System Engr & Development	[Redacted]																														
MMC-S v3.3 SE & Development/DevOps	[Redacted]																														

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)

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				
MMC-S v3.2 Planned Army Interoperability Certification (AIC) 2																																
MMC-S v3.2 Full Deployment Decision (FDD)																																
MMC-S v3.2 First Unit Equipped (FUE)																																
MMC-S v3.3 Planned Operational Test (OT)																																
MMC-S v3.3 Planned Army Interoperability Certification (AIC) 2																																
MMC-S v3.3 Full Deployment Decision (FDD)																																



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ5 / MOUNTED COMPUTING ENVIRONMENT (MCE)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MMC-S v3 Test & Integration	3	2017	4	2018
MMC-S v3.1 Arch, System Engr & Development	1	2019	1	2023
MMC-S v3 Customer Test	1	2019	1	2019
MMC-S Materiel Development Decision (MDD) Briefing	2	2020	2	2020
N-CFT's ITN 19 Experimentation Event	2	2020	2	2020
MMC-S v3.1 Critical Design Review (CDR)	1	2022	1	2022
MMC-S v3.2 Arch, System Engr & Development	3	2022	2	2024
MMC-S v3.1 Limited User Test (LUT)	2	2022	3	2022
MMC-S v3.1 Limited Deployment Decision (LDD)	4	2022	4	2022
MMC-S v3.1 Planned Initial Operational Test & Evaluation (IOT&E)	2	2023	2	2023
MMC-S v3.1 Planned Army Interoperability Certification (AIC) 2	1	2023	2	2023
MMC-S v3.1 Full Deployment Decision (FDD)	4	2023	4	2023
MMC-S v3.1 First Unit Equipped (FUE)	4	2023	4	2023
MMC-S v3.2 Planned Operational Test (OT)	3	2024	3	2024
MMC-S 3.3 Arch, System Engr & Development	2	2024	2	2026
MMC-S v3.2 Planned Army Interoperability Certification (AIC) 2	3	2024	1	2025
MMC-S v3.2 Full Deployment Decision (FDD)	4	2024	4	2024
MMC-S v3.2 First Unit Equipped (FUE)	1	2025	1	2025
MMC-S v3.3 Planned Operational Test (OT)	3	2026	3	2026
MMC-S v3.3 Planned Army Interoperability Certification (AIC) 2	3	2026	1	2027
MMC-S v3.3 Full Deployment Decision (FDD)	4	2026	4	2026

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EJ6 / TACTICAL ENHANCEMENT			
<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>
EJ6: TACTICAL ENHANCEMENT	-	-	-	7.860	-	7.860	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This is a new start in FY 2022.

Project EJ6 / TACTICAL ENHANCEMENT is a new start for Fiscal Year (FY) 2022.

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

This funding line is directly aligned to the Army Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Tactical Enhancement supports the evaluation and testing requirements for Troposcatter Transmission (TROPO) capabilities procured and fielded under the Signal Modernization (SIGMOD) funding line, B00010. TROPO will provide redundancy communications in a Satellite denied environment by providing improved Line of Sight and beyond line of sight radio systems.

SIGMOD Capabilities:

TROPO: Enables Mission Command in a Satellite Denied environment by providing Beyond Line of Sight (BLOS) capability over longer ranges and at higher throughput than the current BLOS System. TROPO extends the network by utilizing a significantly reduced SWaP radio verses the current system. TROPO will enable Army units to reduce reliance on costly satellite bandwidth.

COMMAND POST NETWORKING: Enables Command Post networking capabilities by providing communications solutions to enable a more survivable Command Post against near peer advisories. The solutions will utilize advanced waveform and antenna improvements to decrease radio frequency detection and interception in the battlefield and will be integrated onto the appropriate platforms to increase Command Post survivability.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> IOT&E for TROPO systems	-	-	5.060
<b>Description:</b> Funds support TROPO IOT&E			
<b>FY 2022 Plans:</b>			

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ6 / TACTICAL ENHANCEMENT
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
\$5,060K funds TROPO IOT&E testing requirement			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Project EJ6 / TACTICAL ENHANCEMENT is a new start for FY 2022. Funding required to execute TROPO IOT&E in FY 2022.			
<b><i>Title:</i></b> Command Post Networking	-	-	2.800
<b><i>Description:</i></b> Funds support Command Post Networking			
<b><i>FY 2022 Plans:</i></b> \$2,800K funds Command Post Networking efforts			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Project EJ6 / TACTICAL ENHANCEMENT is a new start for FY 2022. Funding required to execute Command Post Networking efforts in FY 2022			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	7.860

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> Base	<u>FY 2022</u> OCO	<u>FY 2022</u> Total	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> Complete	<u>Total Cost</u>
• B00010: Signal Modernization Program	128.913	151.179	140.036	-	140.036	-	-	-	-	-	-

**Remarks**  
B00010: OPA funding line for Signal Modernization (SIGMOD)

**D. Acquisition Strategy**  
These funds will be used to conduct System Evaluation and Formal Testing of the various Signal Mod capabilities, specifically the TROPO systems. This is in order to facilitate integration into the Tactical Networks. These test events will meet all mandatory testing requirements with full ATEC oversight. This Acquisition Strategy will integrate proven Commercial-Off-The-Shelf (COTS) capabilities into existing Tactical Network nodes to expand and enhance network capacity and user access. The TROPO capabilities are acquired as ACAT III programs to replace legacy equipment in the field while utilizing DoDI 5000.02 standard acquisition approaches, starting with Milestone C Determination for TROPO (4QFY18).

The Acquisition Strategy will integrate proven Commercial-Off-the-Shelf (COTS) capabilities into existing Tactical Network nodes to provide a more secure network connection between command posts, command post vehicles and end user devices.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				EJ6 / TACTICAL ENHANCEMENT								
<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	
Sig Mod	SS/FP	TBD : TBD	1.392	-		-		-		-		-	0.000	1.392	-	
Army Withhold and Unit Task Reorganization (UTR) Realignment	SS/FFP	Harris Corp : Arlington, VA	7.777	-		-		-		-		-	0.000	7.777	-	
<b>Subtotal</b>			9.169	-		-		-		-		-	0.000	9.169	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	
NCW-R	SS/CPFF	CODES1403AALION SCIENCE AND TECHNOLOGY CORPORATION : 202BURR RIDGE IL 60527-0849FACILITY	27.416	-		-		-		-		-	0.000	27.416	-	
<b>Subtotal</b>			27.416	-		-		-		-		-	0.000	27.416	N/A	
<b>Test and Evaluation (\$ 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	
TRILOS Testing	MIPR	ATEC : Aberdeen Proving Ground, MD	19.823	-		-		-		-		-	0.000	19.823	-	
TROPO Testing	MIPR	ATEC : Aberdeen Proving Ground, MD	-	-		-		5.060	Apr 2022	-		5.060	0.000	5.060	-	
Command Post Networking	TBD	TBD : TBD	-	-		-		2.800	Apr 2022	-		2.800	0.000	2.800	-	
<b>Subtotal</b>			19.823	-		-		7.860		-		7.860	0.000	27.683	N/A	





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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ6 / TACTICAL ENHANCEMENT

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
IOT&E for TROPO									IOT&E TROPO																			
IOC for TROPO													1 IOC TROPO															
FRP for TROPO													2 FRP TROPO															
Test Reports													Test Reports															
Command Post Networking													Cmd Post Ntwkg															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EJ6 / TACTICAL ENHANCEMENT

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IOT&E for TROPO	3	2022	4	2022
IOC for TROPO	3	2023	3	2023
FRP for TROPO	3	2023	3	2023
Test Reports	1	2023	1	2023
Command Post Networking	3	2022	4	2022

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT			
<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>
EK9: TACTICAL NETWORK OPERATIONS AND MANAGEMENT	-	3.499	3.252	3.366	-	3.366	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This funding line supports the Army Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

Tactical Network Operations Management's (TNOM) purpose is to create Unified Network Operations (UNO). UNO is a software centric, integrated NetOps capability being developed, as a rapid prototype - proceeding under Section 804 Mid-Tier Acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM). Enabling common planning, configuration, monitoring, provisioning, management, and defense of the Network, UNO configures and integrates tactical and enterprise networks to allow delivery of information and communications among Soldiers at all echelons utilizing network resources prioritized according to the Commander's intent. In developing UNO, TNOM follows the Army's Development Operations (DevOps) approach - creating Network Operations (NetOps) prototypes, gaining user feedback, making adjustments and ultimately delivering enhanced capabilities to the operational force in the shortest time possible. UNO development incorporates solutions available in industry and through government agencies - assessing them in an adapt-and-buy approach informed by experimentation, demonstration, and modernization.

FY 2022 funding supports MTA (Section 804) rapid prototyping efforts of UNO v1.1 via NetOps capabilities that build upon current efforts, efforts that align with Chief of Staff of the Army (CSA) guidance to provide delivery of simplified NetOps capabilities across the tactical network, and include emerging capability requirements stemming from Network Cross-Functional Team (CFT) initiatives and directed requirements. UNO will also support the delivery of integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities. Army's approved requirements for UNO are found in the Integrated Tactical Network (ITN) Abbreviated - Capability Definition Document (A-CDD) dated 26 June 2019.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Product Development	2.404	3.252	3.366
<b>Description:</b> Network Planner provides the product development of workflows that guide Soldiers through planning the Tactical Radios, SATCOM, Line of Sight (LOS) and TROPO systems, automates the analysis process to recommend locations to place LOS Nodes based on Area of Responsibility, improves Planning accuracy for Antenna & Radio templates, based on updated performance parameters, simplifies configuration operations through the use of a centralized network database and supports Unit Task Reorganization (UTR), and provides consistent look and feel with embedded training.			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Network Management provides the product development into the Network Common Operational Picture (COP) for all tactical networks systems, management to Tactical Radios, SATCOM Line of Sight (LOS) and TROPO systems, network status information to monitor and adjust the network to meet mission requirements, and consistent look and feel with embedded training.</p> <p><b>FY 2021 Plans:</b> FY 2021 funding will support MTA (Section 804) rapid prototyping efforts of UNO via NetOps capabilities that build upon current efforts, expand those efforts to address CSA priorities, and include emerging capability requirements stemming from Network CFT initiatives and directed requirements. Support development, assessments, and deliveries of integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities.</p> <p>UNO's MTA will support prototyping of NetOps capabilities that enable command and control of the Tactical Network which will provide simplicity via a Common Operating Picture (COP), a flexible framework enabling rapid integration of future commercial/ government tools, and reliable network information to the Soldiers.</p> <p>The Network Planner and Network Management capabilities will support Network CFT initiatives and directed requirements utilizing the adapt and buy approach, as well as modernization, put forth by Army leadership.</p> <p>Continues product development of the simplified Network Planner functionality, which enables automated NetOps capabilities to plan, manage and operate the Tactical Network via user workflows and reduces the cognitive burden to the Soldiers. Will continue development of Radio Planning capabilities in order to plan and create configuration files for emerging Integrated Tactical Network (ITN) radios and waveforms.</p> <p>Continues product development of the simplified Network Management functionality, which enables the management and troubleshooting of the network elements that comprise the Tactical Network by monitoring local nodes for network health status, performance, location, and security, in addition to displaying monitored data to the local operator. Will continue enhancement and integration of the Federated Data Repository, which reduces time in task to the Soldiers and enables rapid Unit Task Reorganization (UTR).</p> <p><b>FY 2022 Plans:</b> FY 2022 funding will support MTA (Section 804) rapid prototyping efforts of UNO via NetOps capabilities that build upon current efforts, expand those efforts to address CSA priorities, and include emerging capability requirements stemming from Network CFT initiatives and directed requirements. Support development, assessments, and deliveries of integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities.</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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>UNO's MTA will support prototyping of NetOps capabilities that enable command and control of the Tactical Network which will provide simplicity via a Common Operating Picture (COP), a flexible framework enabling rapid integration of future commercial/government tools, and reliable network information to the Soldiers.</p> <p>The Network Planner and Network Management capabilities will support Network CFT initiatives and directed requirements utilizing the adapt and buy approach, as well as modernization, put forth by Army leadership.</p> <p>Continues product development of the simplified Network Planner functionality, which enables automated NetOps capabilities to plan, manage and operate the Tactical Network via user workflows and reduces the cognitive burden to the Soldiers. Will continue development of Radio Planning capabilities in order to plan and create configuration files for emerging Integrated Tactical Network (ITN) radios and waveforms.</p> <p>Continues product development of the simplified Network Management functionality, which enables the management and troubleshooting of the network elements that comprise the Tactical Network by monitoring local nodes for network health status, performance, location, and security, in addition to displaying monitored data to the local operator. Will continue enhancement and integration of the Federated Data Repository, which reduces time in task to the Soldiers and enables rapid Unit Task Reorganization (UTR).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase from FY21 to FY22 represents continuation of NetOps component development.</p>			
<p><b>Title:</b> Testing <b>Description:</b> Testing in support of the UNO MTA development efforts</p>	1.095	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	3.499	3.252	3.366

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• BA9312: NETWORK MANAGEMENT SYSTEM	13.534	5.230	21.625	-	21.625	-	-	-	-	-	-

**Remarks**  
BA9312 (Network Management System) investments into UNO provide engineering support and integration of Network Planner and Network Management capabilities. Continued investments provide ability to conduct DevOps w/ Soldier feedback via Pilot exercises.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	<b>Project (Number/Name)</b> EK9 / <i>TACTICAL NETWORK OPERATIONS AND MANAGEMENT</i>

**D. Acquisition Strategy**

Unified Network Operations (UNO) (EK9) supports the Section 804, mid-tier acquisition (MTA) authority granted by the Army Acquisition Executive (AAE)'s 14 May 2019 Acquisition Decision Memorandum (ADM).

UNO will leverage the MTA (Section 804) Rapid Prototyping acquisition strategy allowing for rapid prototyping of NetOps Solutions using incremental development and employing Commercial Off-The-Shelf (COTS) innovative technologies to demonstrate new Plan, Manage, Provision, and Secure Network capabilities that meet Army modernization and operational needs. UNO will provide adequate experimentation and incorporate Soldier feedback to mitigate cost, schedule, and performance risks early in program lifecycle, receive analysis of technology/design maturity and component integration/interoperability, and provide requirement refinement.

The objective of the MTA (Section 804) is to develop and deliver prototypes into experimentation events for user feedback through FY 2024 within simulated operational environment(s) in order to provide operational capabilities within five years of the development of an approved requirement.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT							
<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
Software Development	C/FFP	Various : Various	7.631	2.404	Feb 2020	3.252	Jan 2021	3.366	Jan 2022	-		3.366	0.000	16.653	-
<b>Subtotal</b>			7.631	2.404		3.252		3.366		-		3.366	0.000	16.653	N/A
<b>Test and Evaluation (\$ 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
Test Support	MIPR	ATEC support : Various	-	0.264	Dec 2019	-		-		-		-	0.000	0.264	-
Network Planner Lab Hardware	MIPR	Network Planner Lab Hardware Procurement : APG	-	0.831	Mar 2020	-		-		-		-	0.000	0.831	-
<b>Subtotal</b>			-	1.095		-		-		-		-	0.000	1.095	N/A
<b>Project Cost Totals</b>			7.631	3.499		3.252		3.366		-		3.366	0.000	17.748	N/A
<b>Remarks</b>															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

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
UNO CS21 Development, Prototype User Feedback, & Testing	[Redacted]				[Redacted]																							
Manpack/ Leader OT Event	[Redacted]				■ Manpack/ Leader OT Event																							
UNO CS23 PDR	[Redacted]				▲ UNO PDR																							
UNO CS23 Development, Prototype User Feedback, & Testing	[Redacted]				[Redacted]																							
UNO v1.0 Transitioned to CS21	[Redacted]				▲ UNO v1.0 Transitioned to CS21																							
UNO CS23 CDR	[Redacted]				[Redacted]				▲ UNO CDR																			

**Note**  
Program Office conducted several Planner Soldier Feedback opportunities including:  
Network Management:



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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 5	PE 0604818A / Army Tactical Command & Control Hardware & Software	EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT
FHTX/11th TTSB: 20-25SEP20 FBTX/86th ESB/11th TTSB: 27SEP-2OCT20 FHAZ/40th ESB/11th TTSB: 27SEP-2OCT20		
Network Planning: Weekly working group user sessions Coordination w/ 11 Signal Brigade, Warrant officers representing CW4, SC/255N, and the 101 AD S6.		

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EK9 / TACTICAL NETWORK OPERATIONS AND MANAGEMENT

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MTA Request to DASM	2	2019	2	2019
UNO MTA (Section 804) AAE Approval	3	2019	3	2019
UNO MTA (Section 804) Rapid Prototyping Start	3	2019	3	2019
UNO CS21 Development, Prototype User Feedback, & Testing	3	2019	2	2021
Manpack/ Leader OT Event	2	2021	2	2021
UNO CS23 PDR	2	2021	2	2021
UNO CS23 Development, Prototype User Feedback, & Testing	2	2021	4	2022
UNO v1.0 Transitioned to CS21	3	2021	3	2021
UNO CS23 CDR	2	2022	2	2022

**Note**

Program projects MTA (Section 804) approval will support rapid prototyping efforts of UNO via NetOps capabilities that build upon current efforts, expand those efforts to address CSA priorities, and include emerging capability requirements stemming from Network Cross Functional Team (CFT) initiatives and directed requirements. Support delivering integrated capabilities to plan, install, operate, maintain, and secure the Army's end-to-end network in support of the commander's mission priorities. UNO's capabilities will expand on Network CFT initiatives and directed requirements are Network Management, Integrated Planner, Radio Planner, and Federated Data Repository utilizing the try, buy, decide strategy put forth by Army leadership.

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)			
<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>
EQ8: Mobile/Handheld Computing Environment (M/HHCE)	-	4.658	4.967	5.105	-	5.105	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project EQ8 - The Common Operating Environment (COE) is an approved set of computing technologies and standards that enables secure and interoperable applications to be developed and executed rapidly across a variety of computing environments. The Mobile/Handheld Computing Environment (M/HHCE) is one of the six computing environments under the COE, which provides the standards for all Army hand held applications enabling the use of common End User Devices by Soldiers, thereby eliminating redundant devices and reducing the Soldiers' load.

Nett Warrior (NW) and Integrated Visual Augmentation System (IVAS) are the instantiation of the M/HHCE and comply with the technical standards documented by the M/HHCE and provide the dismounted common computational platform for other products relevant to dismounted Soldiers. Through compliance with the M/HHCE, software applications from other programs are integrated with the NW and IVAS systems, reducing the need for duplicate hardware resulting in reduced Soldier Load. The M/HHCE is directly aligned to the Army Network Modernization Strategy Line of Effort (LOE) 1 (Unified Network). M/HHCE also supports the Army Network Modernization Strategy LOE 2 (Common Operating Environment). These efforts are aligned to the Army's Tactical Network Capability Set development and fielding plans by utilizing (1) interoperable data, message, and waveforms, (2) sensors and applications that enable operations across domains and (3) integration with Joint C4ISR and strike capabilities. NW leverages commercial smart phone devices and secure Army tactical radios to provide the dismounted leader an integrated mission command and situational awareness capability for use during combat operations. NW applied feedback from conventional and Special Operations units to procure and implement Secret and Secure But Unclassified (SBU) networking equipment for BCTs and the Security Force Assistance Brigades to enable faster, more flexible Mission Command data exchanges with Joint and Coalition forces while maintaining the existing integrated mission command capability with Mounted CE (e.g., JBCP) system. NW uses Commercial-Off-The-Shelf (COTS) and Non Developmental (NDI) computational & communication equipment to create a robust and flexible Integrated Tactical Network that enables faster and more accurate decision making in fights at the tactical level.

Requirements for the M/HH CE are established in the AROC approved COE Information Systems Initial Capability Document (IS ICD), the M/HHCE Requirements Definition Package (RDP), and the NW Capability Development Document in lieu of Capability Production Document. This project is in the Army's Top 100 Modernization efforts. M/HHCE plays a Developmental Operations (DevOps) process to incrementally develop capability over time to satisfy requirements and meet fielding decisions. FY 2022 funding will continue DevOps activities to incorporate new capability and enhancements based on user feedback, as well as lay the groundwork to support migration of third-party applications onto the M/HHCE software baselines. Additionally, FY 2022 funding provides for integration/test equipment and risk reduction events/preparation to support Army Interoperability Certification (AIC) scheduled for 1QFY22.

M/HHCE RDT&E resources are used to improve and add software applications / ATAK plug-ins and support NW system integration to enhance Soldier capabilities, network performance, and network resiliency.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>Title:</b> Test and Evaluation</p> <p><b>Description:</b> Test and evaluation efforts include the planning and conduct of combined COE events with Command Post/Mounted Computing Environment, Software Acceptance Testing, System Integration Events, Risk Reduction Events, Security Penetration Testing and Operational Assessment like annual Army Expeditionary Warrior Experiment (AEWE) to gain Soldier Touch point feedback on new capabilities.</p> <p><b>FY 2021 Plans:</b> Conduct NW test and 3rd party applications evaluation for technical verification at developmental test events and user verification. Conduct a planned assessment of Integrated Tactical Network (ITN) in an S/ABCT. Support NW as a baseline JWA system including: Brigade level support, equipping, training, and spares for NW; conduct yearly Army Interoperability Certification; environmental testing; and Information Assurance penetration prevention testing for new commercial smart devices, software and accessories. Support Army Expeditionary Warrior Experiment (AEWE) testing.</p> <p><b>FY 2022 Plans:</b> Continue NW system test and 3rd party applications evaluation for technical verification at developmental test events and user verification. Support planned assessment of Integrated Tactical Network (ITN) in ABCT. Conduct yearly environmental testing to characterize commercial &amp; military items, Information Assurance penetration prevention testing off integration of commercial devices, software and accessories into NW baseline. Support Army Expeditionary Warrior Experiment (AEWE) assessment to gain Soldier touch point feedback on dismounted capabilities.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 expecting minor decrease focus on Vertical Height Antenna ?Heavy variant (two radios) and technical testing / operational assessment for extended Battalion range communication.</p>		0.965	1.070	0.980
<p><b>Title:</b> Hardware and Software Integration and Evaluation for Capability Improvements</p> <p><b>Description:</b> Hardware and Software Integration and Evaluation for Capability Improvements</p> <p><b>FY 2021 Plans:</b> Evaluate next End User Devices (EUD) and associated hardware components to stay aligned with commercial and Army evolving requirements. Provide NW software / hardware updates to support incorporation of 3rd party software applications onto NW EUD platform, Army Interoperability Certification (AIC) and cyber security testing. Support DARPA integration and transition of future technologies. Update software to M/HHCE standards as revised to maintain compliance with COE. Continue integration of Cyber Electromagnetic Activities (CEMA) capability into the NW system to support EW threat detections and location finding.</p> <p><b>FY 2022 Plans:</b></p>		1.879	1.420	1.630

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue to evaluate next future End User Devices (EUD) and associated hardware components to stay aligned with commercial and Army evolving requirements. Provide NW software / hardware updates to support incorporation of 3rd party software applications onto NW EUD platform, and cyber security improvements. Complete integration of Dismounted Assured PNT Gen 1 integration into the NW. Extending Vertical Height Antenna capability to support Battalion comms ranges. Continue to mature PANTHER (SBIR) capability within NW to provide non-GPS based approach for determining approximate position location information. Start DARPA SHARE multi-level security integration on EUD.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 expecting minor increase due to Vertical Height Antenna ?Heavy variant hardware to support hardware integration.				
<b>Title:</b> Software Development & Integration		0.469	1.433	1.450
<b>Description:</b> Funding is provided for the following efforts.				
<b>FY 2021 Plans:</b> Evaluate next generation NW map engine and Operating System (OS) trade studies and Assured Position, Navigation and Timing (PNT) software development efforts with NW. Update NW Software Development Kit (SDK) with new functionality. Continue software upgrades to ITN component software based on security and operational requirements. Continue incorporating the Army's Common Operating Environment (COE) 3.0 Cross-Cutting Capabilities into NW software. Continue development of NW's next generation Service Oriented Architecture and Tactical Assault Kit plug-ins.				
<b>FY 2022 Plans:</b> Continue software development incorporating the Army's Common Operating Environment (COE) Cross-Cutting Capabilities into NW. Continue software updates to ITN component software based on security and operational requirements in support CS23 ITN efforts. Complete Dismounted Assured PNT Gen 1.x plug-ins and Intra Soldier Wireless software manager to support routing of data to various soldier carried devices. Update NW software development kit with added NW functionality. Complete NW tactical cloud IL5 ecosystem (SBU) to IL6 (to handle up to secret) integration efforts to allow for over the air updates to fielded NW systems for STIG compliance, OS, application updates and remote troubleshooting. Transition from S&T, in conjunction with IVAS program, early spirals of Leader Planning & Decision Tools (Semi-Automated Route planning tool) and Remote Aerial Sensing capabilities to further integrate RF Sensing network traffic and visualizing radio frequency emitters in the battlespace NW & IVAS from CDC-Soldier Center Soldier Sensored Soldier Science and Technology TTA.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Minor increase from FY21 based on planned S&T transition spiral.				
<b>Title:</b> Conduct SEPM Support to NW		1.024	0.750	0.521
<b>Description:</b> Conduct Systems Engineering and Program Management Support to Nett Warrior				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> Conduct government systems / software engineering and program management support for NW program. Will collect input from Soldiers to improve NW size, weight, power, fightability, safety and effectiveness via surveys. Will manage system configuration, and execute test, development and integration planning including investigation and analysis of emerging innovative commercial technologies to reduce the size, weight, power, cost, increase NW and ITN functionality.</p> <p><b>FY 2022 Plans:</b> Continue to conduct government systems / software engineering and program management support for NW program. Will collect input from Soldiers to improve NW size, weight, power, fightability, safety and effectiveness via surveys. Will manage system configuration, and execute test, development and integration planning including investigation and analysis of emerging innovative commercial technologies to reduce the size, weight, power, cost, increase NW and ITN functionality.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight decrease in manpower, about 1 person equivalent, realigning under Test &amp; Evaluation and H/W integration.</p>				
<p><b>Title:</b> M/HHCE Governance</p> <p><b>Description:</b> Development of the M/HHCE standards and M/HHCE governance.</p> <p><b>FY 2021 Plans:</b> Provide Mobile Handheld Computing Environment (M/HHCE) governance and standards development for external program integration with NW and IVAS to eliminate separate handheld devices and reduce Soldier load. Maintain compliance with overarching COE standards.</p> <p><b>FY 2022 Plans:</b> Continue to provide Mobile Handheld Computing Environment (M/HHCE) governance and standards development for external program integration with NW and IVAS to eliminate separate handheld devices and reduce Soldier load. Maintain compliance with overarching COE standards.</p>		0.321	0.294	0.294
<p><b>Title:</b> SBIR/STTR Transfer</p> <p><b>FY 2022 Plans:</b> Funding transferred in accordance with Title 15 USC ?638.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC ?638.</p>		-	-	0.230
<b>Accomplishments/Planned Programs Subtotals</b>		4.658	4.967	5.105

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• R80501: <i>Ground Soldier System</i>	122.400	137.481	150.244	-	150.244	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

To capitalize on commercial industry's investment in advanced smart device technology as well as innovation and changes within Army, Nett Warrior (NW) and IVAS require annual RDT&E funding for integration and evaluation of new technology. Through this process and at low cost, the Army is able to integrate and evaluate for combat utility the hundreds of millions spent in product development by the major commercial device manufactures. The NW and IVAS programs provide situational awareness and mission command to dismounted combat leaders through secure smart devices, a central power source, cables and the Integrated Tactical Network voice and data transport layers. NW funds development and evaluation of new technology and software integration through a combination of competitively awarded contracts and Other Transaction Authorities (OTAs). Various existing follow on procurement contracts are utilized to procure a combination of COTs and GOTs equipment to include supporting services. The NW program completed LRIP/MS C in 2012 followed by two LRIP decisions in 2013-14 in preparation for IOT&E under DOT&E oversight in 4QFY14-1QFY15. This IOT&E event led to an additional NW Low Rate Initial Production (LRIP) decision in 2015 and a Full Rate Production Decision in October 2017. Now in production, NW seeks operational feedback and uses the DevOps process to identify and implement new capabilities. M/HHCE standards are updated annually under the M/HHCE governance process.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)
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<b>Management Services (\$ 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			
System Engineering & Program Management Support	Various	Various : Various	6.377	1.024		0.750		0.521		-		0.521	Continuing	Continuing	-
SBIR/STTR Transfer	TBD	Various : Various	-	-		-		0.230		-		0.230	Continuing	Continuing	-
<b>Subtotal</b>			6.377	1.024		0.750		0.751		-		0.751	Continuing	Continuing	N/A

<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			
Hardware/Software Integration & Evaluation	Various	Various : Various	11.397	1.879		1.420		1.630		-		1.630	Continuing	Continuing	-
MHH Governance	MIPR	Various : Various	10.030	0.321		0.294		0.294		-		0.294	Continuing	Continuing	-
<b>Subtotal</b>			21.427	2.200		1.714		1.924		-		1.924	Continuing	Continuing	N/A

<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			
Software Development and Integration	Various	Various : Various	5.079	0.469		1.433		1.450		-		1.450	Continuing	Continuing	-
<b>Subtotal</b>			5.079	0.469		1.433		1.450		-		1.450	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			
Test and Evaluation	Various	Various : Various	5.329	0.965		1.070		0.980		-		0.980	Continuing	Continuing	-
<b>Subtotal</b>			5.329	0.965		1.070		0.980		-		0.980	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 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)					
	<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>
<b>Project Cost Totals</b>	38.212	4.658		4.967		5.105		-		5.105	Continuing	Continuing	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

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
NW V3.0.5.3 (SBU) & V4.0.5.3 (Secret) S/W dev/integrate/test (M/HHCE & CS21 ITN)																												
Galaxy S20 TE EUD & Case (support part CS21 & CS23): Development																												
NW System Testing & Solder Test Point assessment (S20 device)																												
NW Integration & test events with SBCT to support ITN assessment																												
NW V3.0.6.3 (SBU) & V4.0.6.3 (Secret) S/W dev/integrate/test (M/HHCE & CS22 ITN)																												
NW V3.0.7.3 (SBU) & V4.0.7.3 (Secret) S/W dev/integrate/test (M/HHCE & CS23 ITN)																												
NW V3.0.8.3 (SBU) & V4.0.8.3 (Secret) S/W dev/integrate/test (M/HHCE & CS23 ITN)																												
Dev/integrate Next Gen EUD: Multi-Domain (SBU & Secret one device) (CS25 & CS27)																												
System Testing & Solder Test Point assessment (next gen EUD)																												
NW V5.0.1 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS25 ITN)																												
NW V5.0.2 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS25 ITN)																												
NW V5.0.3 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS27 ITN)																												
NW V5.0.4 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS27 ITN)																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

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
3 Party Integration (tied into yearly NW drops)	[Redacted]																											
SLAD Security Penetration Yearly assessment (March / April)	[Redacted]																											
AEWE Down select, Tech Integration, User Assessment capability (Yearly)(M)	[Redacted]																											
Integration Dismounted Assured PNT Gen 1.x with NW	[Redacted]																											
PANTHER SBIR (GPS denied Position Location) Integration w/ NW & Soldier Touch Pt	[Redacted]																											
Sensored Soldier Leader Planning (Routes) Spiral 1 Integr /Testing (NW/IVAS tie)	[Redacted]																											
Sensored Soldier Remote Sensing Spiral 1 RF emitters Integr/Testing (NW/IVAS tie)	[Redacted]																											
Sensored Soldier Leader Planning & Decision Tool Spiral 2 Integr/Testing (NW/IVAS tie)	[Redacted]																											
Sensored Soldier Remote Sensing Spiral 2 Integration/Testing (NW/IVAS tie)	[Redacted]																											
Sensored Soldier Leader Planning & Decision Tool Spiral 3 Integr/Testing (NW/IVAS tie)	[Redacted]																											
Sensored Soldier Remote Sensing Spiral 3 Integration /Testing (NW/IVAS tie)	[Redacted]																											
Intra Soldier Wireless (ISW) software routing manager on EUD	[Redacted]																											
DARPA SHARE Integration (multi-level security) with EUD	[Redacted]																											

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)	

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
Extended NW Tactical Cloud ecosystem form IL5 (SBU) to IL6 (Secret)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
NW V3.0.5.3 (SBU) & V4.0.5.3 (Secret) S/W dev/integrate/test (M/HHCE & CS21 ITN)	1	2020	3	2020
Galaxy S20 TE EUD & Case (support part CS21 & CS23): Development / integration	2	2020	4	2020
NW System Testing & Solder Test Point assessment (S20 device)	1	2021	1	2021
NW Integration & test events with SBCT to support ITN assessment	4	2020	4	2021
NW V3.0.6.3 (SBU) & V4.0.6.3 (Secret) S/W dev/integrate/test (M/HHCE & CS21 ITN)	3	2020	3	2021
NW V3.0.7.3 (SBU) & V4.0.7.3 (Secret) S/W dev/integrate/test (M/HHCE & CS23 ITN)	3	2021	3	2022
NW V3.0.8.3 (SBU) & V4.0.8.3 (Secret) S/W dev/integrate/test (M/HHCE & CS23 ITN)	3	2022	3	2023
Dev/integrate Next Gen EUD: Multi-Domain (SBU & Secret one device) (CS25 & CS27)	1	2023	3	2023
System Testing & Solder Test Point assessment (next gen EUD)	4	2023	3	2024
NW V5.0.1 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS25 ITN)	3	2023	3	2024
NW V5.0.2 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS25 ITN)	3	2024	3	2025
NW V5.0.3 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS27 ITN)	3	2025	3	2026
NW V5.0.4 (SBU / Secret combined) S/W dev/integrate/test (M/HHCE & CS27 ITN)	3	2026	3	2027
3 Party Integration (tied into yearly NW drops)	1	2020	4	2026
SLAD Security Penetration Yearly assessment (March / April)	2	2021	3	2026
AEWE Down select, Tech Integration, User Assessment capability (Yearly)(May-Feb)	3	2020	4	2026
Integration Dismounted Assured PNT Gen 1.x with NW	1	2020	4	2021
PANTHER SBIR (GPS denied Position Location) Integration w/ NW & Soldier Touch Pt	2	2021	1	2024
Sensored Soldier Leader Planning (Routes) Spiral 1 Integr /Testing (NW/IVAS tie)	1	2022	3	2023
Sensored Soldier Remote Sensing Spiral 1 RF emitters Integr/Testing (NW/IVAS tie)	1	2022	3	2023
Sensored Soldier Leader Planning & Decision Tool Spiral 2 Integr/Testing (NW/IVA)	1	2024	3	2025
Sensored Soldier Remote Sensing Spiral 2 Integration/Testing (NW/IVAS tie)	1	2024	3	2025

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EQ8 / Mobile/Handheld Computing Environment (M/HHCE)
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Events	Start		End	
	Quarter	Year	Quarter	Year
Sensored Soldier Leader Planning & Decision Tool Spiral 3 Integr/Testing (NW/IVA)	1	2027	3	2028
Sensored Soldier Remote Sensing Spiral 3 Integration /Testing (NW/IVAS tie)	1	2027	3	2028
Intra Soldier Wireless (ISW) software routing manager on EUD	1	2021	3	2021
DARPA SHARE Integration (multi-level security) with EUD	2	2022	4	2023
Extended NW Tactical Cloud ecosystem form IL5 (SBU) to IL6 (Secret)	1	2021	4	2022

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post			
<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>
ER9: Expeditionary Army Command Post	-	27.706	43.803	52.477	-	52.477	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Command Post Integrated Infrastructure (CPI2) is executed in a two Increment approach. Upon approval of CPI2 Capability Development Document (CDD) , 9 April 2020, the CPI2 Increment nomenclature was recommended for update to align capability to the underlying requirements document. The update to the Increments was done to mitigate confusion of the scope in each increment of the program. The former Increment 1 is now designated as Increment 0 aligned to the Command Post (CP) Directed Requirement (DR) signed 14 Dec 2017. The former Increment 2 is now designated as Increment 1 and is aligned to the CPI2 CDD.

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

This funding line is directly aligned to the Army Network Modernization Strategy Line of Effort (LOE) #4 Command Post. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

The Command Post Integrated Infrastructure (CPI2) program addresses the Army requirements for a more mobile, scalable, interoperable, and agile command posts. Currently fielded command posts are deemed too large and take too long to setup and teardown making them vulnerable to near peer detection and targeting technologies. By integrating mission command warfighting functions on to formation appropriate vehicle platforms, a dispersed command post construct will enable the battle staff to blend in with the overall maneuver formation while giving the commander the ability to synchronize the close fight on the move. This dispersed mobile command post consists of Mission Command Platforms (MCPs) and Command Post Support Vehicles (CPSVs). The MCP is a formation appropriate vehicle that provides digital workstations for all mission command warfighting functions. The CPSV is the hub of the dispersed command post; it hosts mission command servers, radios, local area network components and a secure wireless capability. Specific to Corps/Div, CPI2 will provide a Mobile Command Group (MCG) consisting of formation- appropriate platforms that supports Corps/Div Commanders/Staff with high priority functions while on the move.

Increment 0 experimentation will design and prototype an MCP and CPSV capability for two Brigade Combat teams (BCT's), a Division Main and Division MCG. Increment 0 focuses on the integrating CPI2 MCP and CPSV capability on the Family of Medium Tactical Vehicles (FMTV) platforms and shelter systems to provide mobile capability and increased survivability to the Command Post. The BCT designs will be tested to solicit soldier feedback and inform an Increment 0 Milestone C production decision for a limited production set of 5 BCTs. Division Main and Division MCG tests will inform Inc 1 designs and potentially drive future requirement updates as to how best to execute CPI2 at the Division Main.

Increment 1 will expand CPI2 capability entering at Milestone B by focusing on the development and prototype and testing of the MCP/CPSV/MCG for formation-appropriate platforms (Stryker, AMPV and JLTV ) that were not addressed in Increment 0. The production decision at Increment 1 Milestone C will support the CPI2 Capability Development Document (CDD) requirement to field CPI2 capability to 86 Army units. These combined capabilities will enable the Army to employ

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post
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command posts across the operational spectrum, from early entry to major combat operations that will resolve current command post issues with set up and tear down, survivability, mobility, suitability and footprint.

FY 2022 funding will support design/development/prototyping of the MCP/CPSV on the formation appropriate platforms for Stryker, AMPV, JTLV using their existing contracts. Other efforts include prototype design and test for a Towable Expeditionary Shelter System (TESS) for use at Division and Corps. Funds execute engineering changes based on soldier feedback from Operational Assessments, acquisition of equipment to support product development, testing, logistical support and program management.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Product Development</p> <p><b>Description:</b> Includes the costs for design/integration/fabrication and prototyping efforts to address capability gaps identified in current Army command post formations. Also includes equipment and ancillary items necessary to develop an operational concept of CPI2 utilizing the Mission Command Platform, Command Post Support Vehicle and Mobile Command Group.</p> <p><b>FY 2021 Plans:</b> FY 2021 initiates the funding for the design engineering, and prototype development of formation appropriate platforms (Stryker, FMTV, APMV, JLTV) to meet design requirements for Command Post Mission Command Platform (MCP) , Command Post Support Vehicles (CPSV) and Mobile Command Groups (MCG ) to include shelter systems and equipment needed to meet CPI2 functionality. Additional design improvements for CPI2 to be based on unit feedback. Includes costs to deliver 2 Brigade Combat Teams and a Division Main for unit experimentation for CPI2 Increment 1. Funding includes costs to address engineering change proposals and program management. This efforts funding will be executed by Program Executive Office Command, Control, Communications Tactical.</p> <p><b>FY 2022 Plans:</b> FY 2022 funds continue design engineering, and prototype development of Mission Command Platforms and Command Post Support Vehicles for formation appropriate platforms (APMV, JLTV, Stryker) by executing funds on their existing platform contracts. FY22 also funds engineering change proposals for updates to improve CPI2 designs based on soldier feedback from Operational Assessments. This funding will be executed by Program Executive Office Command, Control, Communications - Tactical (PEO-C3T).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase associated with need to procure Stryker prototypes and ramp up in AMPV/JLTV EMD.</p>	20.072	33.488	41.481
<p><b>Title:</b> Systems Test and Evaluation</p> <p><b>Description:</b> Costs required for test activities to inform CPI2 solution set.</p> <p><b>FY 2021 Plans:</b></p>	0.740	5.174	3.502



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Conduct initial test/safety activities necessary for completion of delivery of two brigade combat teams and a Division main, as well as formation appropriate platform testing (Stryker, FMTV, APMV, JLTV) associated with design improvements for Command Post MCP, CPSV and MCG. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p><b>FY 2022 Plans:</b> FY22 funds provide for safety confirmation for platforms and shelter systems, testing for the Towable Expeditionary Shelter System (TESS), test articles and test planning. This funding will be executed by Program Executive Office Command, Control, Communications -Tactical (PEO-C3T).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Minor decrease driven by changes in test schedule and scope from FY21 to FY22.</p>				
<p><b>Title:</b> Program Office Management</p> <p><b>Description:</b> Contractor/Matrix Labor support and program travel.</p> <p><b>FY 2021 Plans:</b> Contract and Matrix personnel to support CPI2 in achieving mission requirements to include managing multiple design/ prototyping efforts, test events and training. This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.</p> <p><b>FY 2022 Plans:</b> Contract and Matrix personnel to support CPI2 in achieving mission requirements to include managing multiple design/prototyping efforts, test events and training. This funding will be executed by Program Executive Office Command, Control, Communications - Tactical (PEO-C3T).</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Program Support increase is driven by inflation and minor increase to address managing multiple Platform EMD efforts.</p>		3.869	4.178	4.388
<p><b>Title:</b> Support Costs</p> <p><b>Description:</b> Program costs for training and development of data packages.</p> <p><b>FY 2021 Plans:</b></p>		3.025	0.963	3.106

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Funding supports updates necessary to technical data packages and training for test events as well as initial design changes with formation appropriate platforms (Stryker, AMPV, FMTV, JLTV). This efforts funding will be executed by Program Executive Office Command, Control, Communications - Tactical.			
<b>FY 2022 Plans:</b> Funding supports updates necessary to technical data packages and training for test events as well as initial design updates to Technical Data Packages for the platforms in the CPI2 formations. Includes retrograde of the two test units. This funding will be executed by Program Executive Office Command, Control, Communications - Tactical (PEO-C3T).			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase driven by retrograde of BCT 1 and BCT 2 to take back equipment issued during Operational Assessment.			
<b>Accomplishments/Planned Programs Subtotals</b>	27.706	43.803	52.477

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• B29801: CPI2	-	23.000	49.410	-	49.410	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The CPI2 Materiel Development Decision (MDD) Acquisition Decision Memorandum (ADM) was signed on 21 June 2018 and directs CPI2 to be executed in two increments. Following the approval of the CPI2 Capability Development Document (CDD), 9 April 2020, the nomenclature for the two Increments was recommended for update to align with the supporting requirements documents. Increment 0 (formerly Increment 1) aligns to the Command Post Directed Requirement (CP DR) and Increment 1 (formerly Increment 2) aligns with the approved CDD.

Increment 0 development is focused on the design/development of a Mission Command Platform (MCP) and Command Post Support Vehicle (CPSV) on Family of Medium Tactical Vehicles (FMTV) platforms and associated shelter systems to develop a more mobile, survivable command post. The capability developed will address needs identified in the signed CP DR to experiment with a Brigade Combat Team (BCT), a Division Main and a platform based Mobile Command Group (MCG) to 1 Division. Increment 0 is using the Buy, Try, Assess, and Decide acquisition model which leverages user experimentation to inform follow-on program requirements. Increment 0 will prototype and integrate available commercial off the shelf (COTS) as well as Government Programs of Record (PoRs) equipment that provide mission command and communications functions within the command post. Increment 0 will work with the Government and with Industry to capitalize on their experiences with mobile Command Posts. CPI2 Increment 0 will develop BCT #1 through experimentation conducted with Combat Capabilities Development Center (CCDC) via a Functional Support Agreement (FSA). CPI2 executed a full and open competition under Other Transaction Authority (OTA) to award a contract for design and prototyping the MCP/CPSV for BCT #2. The integration efforts of the government and industry led designs for BCT 1 and BCT 2 will culminate with 2 Operational

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	<b>Project (Number/Name)</b> ER9 / <i>Expeditionary Army Command Post</i>
<p>Assessments on the BCT MCP and CPSV prototype designs, leading to an Increment 0 Milestone C. The Increment 0 Milestone C will authorize production of 3 new BCT's and any necessary updates/retrofit to the first two experimental units to satisfy the conditions of the CP DR to deliver 5 BCTs of CPI2 capability.</p> <p>Increment 0 will experiment at the Division Main executing an Indefinite Delivery Indefinite Quantity (IDIQ) contract. CPI2 will experiment with a Stryker based Mobile Command Group (MCG) to 1 Division via an FSA with Project Manager (PM) Stryker Brigade Combat Team (SBCT). The Division Main and MCG serve to provide a baseline for user inputs for any future CPI2 CDD updates. Any production decisions for Division and MCG would be addressed in the Increment 1 Milestone C.</p> <p>Increment 1 will execute requirements aligned to the CPI2 Capability Development Document (CDD) to replace designated legacy command post systems at Corps, Division, Brigades, Battalions and select Multi-Functional Support Brigades (MFSB). Increment 1 will expand CPI2 capability by developing the MCP/CPSV variants for formation appropriate platforms (Stryker,AMPV,JLTV) via mods to their existing contracts and includes necessary design testing. The Milestone B for Increment 1 will authorize CPI2 to enter EMD for platform development not addressed in Increment 1; specifically for SBCT, JLTV and AMPV platforms to issue funds on their existing Programs of Record (PoR) contracts for the design/development of their MCP/CPSV/MCG.</p> <p>The Increment 1 Milestone C will initiate the LRIP production and fielding of CPI2 FMTV platforms and shelter systems. CPI2 will pursue a full and open award to contract with industry for the engineering, installation and production of the MCP/CPSV/MCG solution for vehicle platforms and shelter systems. An operational test will be conducted to asses CPI2 on the FMTV platform prior to a Full Rate Production decision. CPI2 will be responsible for the delivering CPI2 equipment to the vendor for installation. Vehicle platforms will be supplied to CPI2; funded and provided by the existing vehicle PoR contracts. Due to the differing durations for development of the formation appropriate platforms (Stryker, AMPV, JLTV); each PoR will assess the CPI2 solution via their individual Functional Qualification Test (FQT). Upon successful test, CPI2 will coordinate with the Milestone Decision Authority (MDA) to request authority to fund the CPI2 installation vendor via Engineering Change Proposal (ECP) to accommodate installation on the Stryker,AMPV,JLTV platforms.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604818A / Army Tactical Command & Control Hardware & Software				ER9 / Expeditionary Army Command Post							
Management Services (\$ in Millions)				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
Civilian Labor	Allot	PM MC : Aberdeen Proving Ground MD	0.108	-		-		-		-		-	Continuing	Continuing	Continuing
SETA Support	MIPR	CACI : Aberdeen Proving Ground, MD	0.770	1.850	Oct 2019	1.964	Nov 2020	-		-		-	0.000	4.584	-
SETA Support	MIPR	Booz Allen Hamilton : Aberdeen Proving Ground, MD	-	-		-		2.063	Dec 2021	-		2.063	Continuing	Continuing	Continuing
Matrix Support	MIPR	Various : Aberdeen Proving Ground, MD	1.720	2.019	Oct 2019	2.214	Nov 2020	2.325	Dec 2021	-		2.325	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.598	3.869		4.178		4.388		-		4.388	Continuing	Continuing	N/A
Product Development (\$ in Millions)				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
BCT 1 Design/Fabrication/Installation	MIPR	CCDC-C5ISR : Aberdeen Proving Ground, MD	4.296	3.513	Dec 2019	2.947	Dec 2020	-		-		-	Continuing	Continuing	Continuing
BCT 2 Design/Fabrication/Installation	C/FFP	ELBIT : Ft.Worth, Texas	4.129	5.628	Sep 2020	6.278	Nov 2020	-		-		-	Continuing	Continuing	Continuing
Engineering Changes	Option/FFP	ELBIT : Ft.Worth, Texas	-	-		1.850	Jun 2021	1.322	Oct 2021	-		1.322	Continuing	Continuing	Continuing
Division Design/Fabrication/Installation	C/IDDQ	BRTRC : Ft.Bliss, Texas	1.338	4.002	Dec 2019	5.736	Nov 2020	0.760	Oct 2021	-		0.760	Continuing	Continuing	Continuing
Vehicle Platforms	Allot	PdM MPVS : Detroit Aresnal, MI	9.764	0.278	Jan 2020	-		-		-		-	Continuing	Continuing	Continuing
Ancillary Items	MIPR	Various : Various	3.122	1.516	Oct 2019	1.175	Oct 2020	0.864	Dec 2021	-		0.864	Continuing	Continuing	Continuing
CPI2 Core Kits	Various	Multiple : Multiple	5.569	4.101	Oct 2019	1.700	Mar 2021	1.150	Oct 2021	-		1.150	Continuing	Continuing	-
Mobile Command Group Experimentation	MIPR	PM SBCT : Warren, MI	0.345	0.080	Nov 2020	3.102	Feb 2021	-		-		-	Continuing	Continuing	Continuing
ISO Containers	Allot	BERG : Spokane, WA	11.100	-		-		-		-		-	Continuing	Continuing	Continuing

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post
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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			
Stryker MCP Design/ Development	Allot	PM SBCT : Detroit, MI	-	-		5.604	Apr 2021	25.681	Oct 2021	-		25.681	Continuing	Continuing	Continuing
AMPV MCP Design/ Development	Allot	PM AMPV : Detroit Aresnal, MI	-	-		1.406	Apr 2021	5.151	Jan 2022	-		5.151	Continuing	Continuing	Continuing
JLTV MCP/CPSV Design/ Development	Allot	PM JLTV : Detroit , MI	-	-		1.406	Apr 2021	4.021	Jan 2022	-		4.021	Continuing	Continuing	Continuing
Rigid Wall Shetler Design	MIPR	CCDC-C5ISR : APG, MD	-	-		1.483	May 2021	1.450	Jan 2022	-		1.450	Continuing	Continuing	Continuing
TESS Design/ Development (Medium/ Large)	Allot	PdM FSS : Natick, MA	-	0.954	Jun 2020	0.801	May 2021	1.082	Jan 2022	-		1.082	Continuing	Continuing	Continuing
<b>Subtotal</b>			39.663	20.072		33.488		41.481		-		41.481	Continuing	Continuing	N/A

**Remarks**  
 1) Product Development increase with Stryker is driven requirement for 5 Stryker prototypes to include A-KITs and integration.  
 2) CPI2 funds existing contracts managed by Stryker,AMPV and JLTV to execute design/development.

<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			
Tech Manuals/Training Development Packages	Various	Various : Various	-	3.025	Feb 2020	0.963	Mar 2021	1.001	Oct 2021	-		1.001	Continuing	Continuing	Continuing
Retrograde (BCT1&2)	TBD	TBD : TBD	-	-		-		2.105	Dec 2021	-		2.105	0.000	2.105	-
<b>Subtotal</b>			-	3.025		0.963		3.106		-		3.106	Continuing	Continuing	N/A

**Remarks**  
 Retrograde: CPI2 plan to take back and un-install equipment/platforms from BCT 1 and 2 experimentation.



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post

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
Inc 0: Product Development (BCT Unit) -Gov't Design	[Redacted]				[Redacted]																							
Inc 0: BCT Unit Safety Release Testing					[Redacted]																							
Inc 0: BCT Operational Assessment									[Redacted]																			
Inc 0: Product Development (BCT Unit) - Elbit Design	[Redacted]				[Redacted]																							
Inc 0: BCT Safety Release Testing					[Redacted]																							
Inc 0: BCT Operational Assessment									[Redacted]																			
Inc 0: Engineering Changes									[Redacted]																			
Inc 0: Milestone C									3																			
Inc 0: Safety Confirmation Test													[Redacted]															
Inc 0: Production/Installation													[Redacted]															
Inc 0: BCT Fieldings													[Redacted]															
Inc 0: Division/MCG Development	[Redacted]				[Redacted]				[Redacted]																			
Inc 0: Div/MCG Safety Release Test					[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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post

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
Inc 0: Division Main /MCG New Equipment Training/Fielding																												
Inc 0: Division Main/MCG Operational Assessment																												
Inc 1: Capability Development Document Approved																												
Inc 1: Milestone B																												
Inc 1: Stryker/AMPV/JLTV Platform Design/Prototype/Test																												
Inc 1: FMTV based Risk Reduction Event																												
Inc 1: OT (FMTV/Shelters/TESS)																												
Inc 1: JLTV FQT																												
Inc 1: Stryker FQT																												

**Note**  
 1) Inc 0: Test: Nomenclature updated from Limited User Test to Operational Assessment to better define scope of the event.  
 2) Inc 0: DIV Main and MCG experiment do not drive Inc 0 MS C decision for BCT 3-4 -5 but serve to potentially inform future CDD updates.



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / <i>Army Tactical Command &amp; Control Hardware &amp; Software</i>	<b>Project (Number/Name)</b> ER9 / <i>Expeditionary Army Command Post</i>
3) Inc 1: AMPV FQT not shown (planned in FY27).		

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Command Post Directed Requirement Signed	1	2018	1	2018
CPI2 MDD	3	2018	3	2018
Inc 0: MS A	2	2019	2	2019
Inc 0: Product Development (BCT Unit) -Gov't Design	2	2019	2	2021
Inc 0: BCT Unit Safety Release Testing	4	2020	2	2021
Inc 0: BCT Operational Assessment	4	2021	4	2021
Inc 0: Product Development (BCT Unit) - Elbit Design	4	2019	3	2021
Inc 0: BCT Safety Release Testing	1	2021	2	2021
Inc 0: BCT Operational Assessment	3	2021	3	2021
Inc 0: Engineering Changes	4	2021	1	2022
Inc 0: Milestone C	1	2022	1	2022
Inc 0: Safety Confirmation Test	3	2022	2	2023
Inc 0: Production/Installation	1	2022	4	2024
Inc 0: BCT Fieldings	2	2023	2	2024
Inc 0: Division/MCG Development	4	2019	1	2022
Inc 0: Div/MCG Safety Release Test	3	2021	4	2021
Inc 0: Division Main /MCG New Equipment Training/Fielding	4	2021	1	2022
Inc 0: Division Main/MCG Operational Assessment	1	2022	1	2022
Inc 1: Capablity Development Document Approved	3	2020	3	2020
Inc 1: Milestone B	3	2021	3	2021
Inc 1: Stryker/AMPV/JLTV Platform Design/Prototype/Test	3	2021	1	2025
Inc 1: FMTV based Risk Reduction Event	3	2023	3	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> ER9 / Expeditionary Army Command Post

Events	Start		End	
	Quarter	Year	Quarter	Year
Inc 1: OT (FMTV/Shelters/TESS)	3	2025	3	2025
Inc 1: JLTV FQT	1	2026	1	2026
Inc 1: Stryker FQT	2	2026	2	2026

**Note**  
1) Test: Nomenclature updated since PB21 from Limited User Test to Operational Assessment in to better define scope of event.

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software				<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development			
<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>
EW3: Unit Task Reorganization (UTR) Development	-	26.406	19.027	9.402	-	9.402	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project EW3, Unit Task Reorganization (UTR), supports the Army's Network Modernization Strategy LOE 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

UTR supports the Army Network Plan Framework objective to deliver a Standards Based Network Architecture. This will enable the modernization of the Mission Command Network through the coordination of a common set of network operations tools and infrastructure development supporting the unit communication staff's ability to Manage the Network through the (1) development of an integrated planning tool suite to improve Signal Soldiers ability to plan and develop configurations for upcoming operations and deployments; (2) development of tools and technology that provide a means to deliver configurations with little to no manual involvement by the Soldier and (3) replacement of stove-piped management systems with integrated tools that provide a consolidated, as well as detailed, view of the network and its components.

FY 2022 UTR funding will be used to continue development of network components that support centralized data, security, and information exchanges; continue development of Radio Planning capabilities in order to plan and create configuration files for emerging Integrated Tactical Network (ITN) radios and waveforms; continue development of network device and provisioning systems; and continue the development of a network manager that monitors and displays network health status, performance, location and security to local operator.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Network Provisioning	9.272	6.318	-
<b>Description:</b> UTR is implementing tools and technology to reduce the amount of time and troops required to provision network devices with configurations developed during the planning process. This provides a means to deliver configurations without requiring manual involvement by the Soldier, and for devices to report configuration and operational status in accordance with the Standards Based Architecture. The Rapid Provisioning Systems (RPS) Master Node installation in the Mission Command Support Center (MCSC) in FY 20 provided Integrated global patch management capabilities into across Brigade Combat Teams (BCTs).			
<b>FY 2021 Plans:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Continue development of provisioning systems, and support system integration into use of Standards Based Architecture, including continuing development of Radio capabilities in order to plan and create configuration files for emerging ITN radios and waveforms.</p> <p>Code completion and refinement for closeout and transition to sustainment the Rapid Provisioning System (RPS) effort to automatically patch &amp; provision SATCOM systems. Automated provisioning of the Command Post Computing Environment (CPCE) Tactical Server Infrastructure (TSI) stack in FY 22 for deployment in CS 23. Continuing development of Radio over the air management capabilities in order to plan and create configuration files for emerging ITN radios and waveforms. Over the Air loading via Black Sails for TrellisWare Radios and PRC-148C. Develop Gang Load capability to load multiple radios in parallel via Universal Serial Bus (USB) drives.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Recategorization and alignment of remaining provisioning efforts captured under Network Management.</p> <p><b>Title:</b> Network Management</p> <p><b>Description:</b> UTR introduces improvements to the way the network is managed, reducing closed management systems and replacing them with integrated tools that provide a consolidated, as well as detailed, view of the network and its components.</p> <p>Integrated management of Transportable Tactical Command Communications (T2C2)- Heavy and Lite, Satellite Transportable Terminal (STT), Tactical Communications Node (TCN)-Lite, Scalable Class of Unified Terminals (SCOUT) was provided as part of the Network Manager (NOMS) and deployed in FY 20 to Expeditionary Signal Battalion (ESB?s) and part of CS 21. The initial Tactical Radio Integration Kit (TRIK) Management interface was developed and provided in CS 21 as part of Integrated Tactical Network (ITN).</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue development of network components that support centralized data, security, and information exchanges, enabling Signal Soldier activities.</li> <li>- Additional development of Direct Connection devices that enable automated provisioning, patching, and monitoring.</li> <li>- Continue development of the Network Planning functions that enable automated NetOps capabilities to plan the tactical network, reducing the cognitive burden to Soldiers, as well as development of analytic and planning tools that support Signal Planning in coordination with Mission Command Systems and Applications.</li> </ul>		15.784	11.932	9.119

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>- Continue product development of Network Management functionality enabling the ability to manage and troubleshoot the network devices that comprise the Tactical Network, monitor nodes for network health status, performance, location, and security, in addition to displaying monitored data to the local operator.</p> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete delivery of vendor neutral Application Programming Interface (API) that supports network health status across warfighting applications and S6 tools &amp; services as well as communication across various services.</li> <li>- Continue development of network components that support centralized data, security, and information exchanges, enabling Signal Soldier activities.</li> <li>- Implementation of Bandwidth efficient &amp; NSA approved Over the Network and Over the Air capabilities to provision and reconfigure tactical radios that support Integrated Visual Augmentation System (IVAS), Hand Held Computing Environment (HH CE) &amp; Mounted Computing Environment (MCE).</li> <li>- Continue product development of Network Management functionality enabling the ability to manage and troubleshoot the network devices that comprise the Tactical Network, monitor nodes for network health status, performance, location, and security, in addition to displaying monitored data to the local operator. Extend management interfaces for services (Network Manager &amp; Battalion (BN) and Below Manager).</li> <li>- Continue development of the Tactical radio planner to include planning for additional waveforms, Demand Assigned Multiple Access (DAMA), Satellite Communications (SATCOM), Planning.</li> <li>- Integration of Tactical Network Initialization &amp; Configuration (TNIC) Initialization Process through Initialization Tool Suite.</li> <li>- Continue development of SATCOM planner as replacement for the Tactical Network Toolkit (TNT) Network Management System (NMS) planner for SATCOM systems targeting deployment in CS 23.</li> <li>- Continue development of consolidated Satellite Access Requests &amp; receipt of Satellite Access Authorizations.</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in requirements reflecting transition to steady state development and support.</p>				
<p><b>Title:</b> System of Systems Engineering and Portfolio Management</p> <p><b>Description:</b> Systems engineering and program management support to include development and maintenance of the NetOps architecture, Systems Engineering Plan, Risk Management Plan, Rapid Prototyping, IPT Management, Requirements Engineering, Integrated Master Schedule, and budget formulation and execution.</p> <p><b>FY 2021 Plans:</b></p>		1.350	0.777	0.283

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Continue Systems of Systems Engineering and program management across NetOps portfolio including establishing Architecture and updates of portfolio Management Plan, Risk Management Plan, Rapid Prototyping, IPT/Working Group Management, Requirements Engineering, synchronization of efforts in Integrated Master Schedule.				
<b>FY 2022 Plans:</b> Continue Systems of Systems Engineering and program management across NetOps portfolio..				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in requirements reflecting transition to steady state development and support.				
<b>Accomplishments/Planned Programs Subtotals</b>		26.406	19.027	9.402
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
Unit Task Reorganization (UTR) is an overarching effort that supports the establishment of a standards-based network architecture and integration of requirements across multiple efforts in the tactical network. UTR resources are applied directly to current products which are modified through Engineering Change Proposals and Modified Work Orders to comply with network standards. This enables current systems to share the information, reducing time and task for soldiers as well as new systems to access the network. Efforts are enduring to react to evolving prioritization of requirements. A variety of contracting approaches are used depending on needs, such as Other Transactions, Indefinite Delivery/Indefinite Quantity, or Systems Engineering Technical Assistance.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604818A / Army Tactical Command & Control Hardware & Software				Project (Number/Name) EW3 / Unit Task Reorganization (UTR) Development							
Product Development (\$ in Millions)				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
Network Provisioning	C/IDIQ	Microsoft : Redmond, WA	10.573	1.813	Mar 2020	1.000	Nov 2020	-		-		-	0.000	13.386	-
Network Provisioning	MIPR	Matrix Organizations : APG MD	2.866	4.117	Nov 2019	3.371	Nov 2020	-		-		-	0.000	10.354	-
Network Provisioning	FFRDC	MITRE : Mclean, VA	3.600	1.252	Oct 2019	1.271	Oct 2020	-		-		-	0.000	6.123	-
Network Provisioning	C/CPFF	Telesis : Mclean, VA	5.521	1.436	Aug 2020	0.321	Mar 2021	-		-		-	0.000	7.278	-
Network Provisioning	Option/CPAF	ESP : APG, MD	-	0.654	Nov 2019	0.355	Nov 2020	-		-		-	0.000	1.009	-
Network Management	C/FFP	Various : TBD	19.564	15.317	Nov 2019	11.532	Dec 2020	9.119	Jan 2022	-		9.119	Continuing	Continuing	Continuing
Network Management	MIPR	PEO Soldier : Arlington VA	0.792	-		-		-		-		-	0.000	0.792	-
Secure Wireless - SFF	C/Various	Various : Various	4.091	-		-		-		-		-	0.000	4.091	-
Network Management	MIPR	C5ISR : APG, MD	-	0.467	Mar 2020	0.400	Nov 2020	-		-		-	0.000	0.867	-
<b>Subtotal</b>			47.007	25.056		18.250		9.119		-		9.119	Continuing	Continuing	N/A
Support (\$ in Millions)				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
SoS SE and PM	C/CPAF	BAH : APG MD	1.765	1.350	Nov 2019	0.777	Nov 2020	0.283	Nov 2021	-		0.283	Continuing	Continuing	Continuing
<b>Subtotal</b>			1.765	1.350		0.777		0.283		-		0.283	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			48.772	26.406		19.027		9.402		-		9.402	Continuing	Continuing	N/A
<b>Remarks</b>															



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development	

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
<b>Network Management</b>																												
Network Manager Phase 2																												
Network Manager Phase 3																												
Network Manager Phase 4																												
Network Manager Phase 5																												
Network Manager Phase 6																												
<b>Network Planning</b>																												
<b>Radio Planner</b>																												
Radio Planner v1.1																												
Radio Planner v1.2																												
Radio Planner v1.3																												
<b>Network Planner</b>																												
Network Planner v1.0																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development	

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
Network Planner v1.1																												
Network Planner v1.2																												
Network Planner v1.3																												
Network Planner v1.4																												
Network Provisioning																												
<b>Radio Provisioning</b>																												
Black Sails 2.2																												
Black Sails 2.3																												
Radio Provisioner x.1																												
<b>Data Repository</b>																												
Codex 1.1																												
Data Repository x.x																												
eOTAM 2.0																												

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development	

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
Radio Standards version x.1																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Network Management	1	2019	4	2024
Network Manager Phase 1	1	2019	4	2019
Network Manager Phase 2	1	2020	4	2020
Network Manager Phase 3	1	2021	4	2021
Network Manager Phase 4	1	2022	4	2022
Network Manager Phase 5	1	2023	4	2023
Network Manager Phase 6	1	2024	4	2024
Network Planning	1	2020	4	2024
JENM 3.5	1	2019	4	2019
Radio Planner	1	2019	2	2021
Radio Planner v1.0	4	2018	4	2018
Radio Planner v1.1	1	2020	2	2020
Radio Planner v1.2	3	2020	4	2020
Radio Planner v1.3	1	2021	2	2021
Network Planner	1	2020	4	2024
Network Planner v1.0	1	2020	4	2020
Network Planner v1.1	1	2021	4	2021
Network Planner v1.2	1	2022	4	2022
Network Planner v1.3	1	2023	4	2023
Network Planner v1.4	1	2024	4	2024
Network Provisioning	1	2019	4	2024
Rapid Provisioning System (RPS) 2.4	2	2019	2	2019

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604818A / Army Tactical Command & Control Hardware & Software	<b>Project (Number/Name)</b> EW3 / Unit Task Reorganization (UTR) Development
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Events	Start		End	
	Quarter	Year	Quarter	Year
Radio Provisioning	1	2019	4	2022
Black Sails 2.0	3	2019	3	2019
Black Sails 2.1	4	2019	4	2019
Black Sails 2.2	1	2020	1	2020
Black Sails 2.3	2	2019	4	2020
Radio Provisioner x.1	1	2021	4	2021
Data Repository	1	2019	4	2025
Codex 1.0	1	2019	1	2019
Codex 1.1	1	2020	4	2020
Data Repository x.x	1	2021	4	2025
eOTAM 2.0	3	2019	4	2020
Radio Standards version x.1	4	2020	4	2021

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / <i>Radar 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	-	91.782	105.271	127.919	-	127.919	-	-	-	-	-	-
E10: <i>Sentinel</i>	-	91.782	105.271	127.919	-	127.919	-	-	-	-	-	-

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

This system is a component of the overall Air and Missile Defense (AMD) architecture and will provide for an incrementally fielded Integrated Air and Missile Defense Fire Control System/capability for the composite Army Air and Missile Defense Brigades. The Sentinel system is a key component of the Army Integrated Air and Missile Defense (AIAMD) architecture and provides critical air surveillance of the forward areas.

Sentinel A3 consists of a radar-based sensor with its prime mover/power, Identification Friend or Foe (IFF), and Forward Area Air Defense (FAAD) Command, Control and Intelligence (C2I) interfaces. The radar is deployed in both an air defense role and a force protection role for Counter-Rocket, Artillery, and Mortar (C-RAM) missions. The sensor is an advanced three-dimensional battlefield X-Band air defense phased-array radar with an instrumented range of 75 kilometers. Sentinel is capable of operating day or night, in adverse weather conditions, in the battlefield environments of dust, smoke, aerosols and enemy countermeasures. It provides 360-degree azimuth coverage for acquisition tracking. Sentinel contributes to the digital battlefield by automatically detecting, classifying, identifying and reporting targets (cruise missiles, unmanned aircraft systems, rotary wing and fixed wing aircraft). Sentinel acquires targets sufficiently forward of the battle area to allow weapons reaction time and engagement at optimum ranges. Sentinel's integrated IFF reduces the potential for fratricide of US and Coalition aircraft.

The Sentinel A4 Active Electronically Scanned Array (AESA) is the next generation of radar technology to replace the current phase and frequency scanned array used by Sentinel today. Sentinel A4 hardware and software upgrades will extend the range for ground-based surveillance and situational awareness; will have faster and more accurate Non-Cooperative Target Recognition (NCTR) for clearing fires and preventing fratricide; will improve track accuracy, and management of larger track loads; and improve operation in severe/urban clutter. The system will provide simultaneous multi-mission capability and provides hemispherical surveillance to detect and track small targets, such as Unmanned Aircraft Systems (UAS) and Cruise Missiles, in clutter and will detect and track slow targets, such as UAS and Rotary Wing aircraft, at low altitudes in clutter. The system will detect, track, and classify Rocket, Artillery, and Mortar (RAM) threats and will support AIAMD and IFPC requirements with Fire Control quality tracks. Sentinel A4 will incorporate the upgraded AN/TPX-61 IFF with M-Code capability added by replacing the GB-Gram card with M-Code GB-Gram cards.

Sentinel program will develop nascent capability and support Army demonstration and test initiatives to increase integrated offensive and defensive capability across warfighter functions and multiple domains.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / <i>Radar Development</i>
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<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	95.720	109.259	116.381	-	116.381
Current President's Budget	91.782	105.271	127.919	-	127.919
Total Adjustments	-3.938	-3.988	11.538	-	11.538
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.938	-3.988			
• Adjustments to Budget Years	-	-	11.538	-	11.538

**Change Summary Explanation**

Zero sum funding change from Fiscal Year (FY) 2022 Other Procurement Army (OPA) to FY22 Research Development Test & Evaluation (RDT&E) to fully fund the build of five User Operational Evaluation Systems to support the development and scheduling of system of system integration events and to allow soldier touchpoints prior to Low Rate Initial Production (LRIP).

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

Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604820A / Radar Development				Project (Number/Name) E10 / Sentinel			
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
E10: <i>Sentinel</i>	-	91.782	105.271	127.919	-	127.919	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Mission & System Description:

This system is a component of the overall Air and Missile Defense (AMD) architecture and will provide for an incrementally fielded Integrated AMD Fire Control System/ capability for the composite Army Air and Missile Defense Brigades. The Sentinel system is a key component of the Army Integrated Air and Missile Defense (AIAMD) architecture and provides critical air surveillance of the forward areas.

Sentinel A3 consists of a radar-based sensor with its prime mover/power, Identification Friend or Foe (IFF), and Forward Area Air Defense (FAAD) Command, Control and Intelligence (C2I) interfaces. The radar is deployed in both an air defense role and a force protection role for Counter-Rocket, Artillery, and Mortar (C-RAM) missions. The sensor is an advanced three-dimensional battlefield X-Band air defense phased-array radar with an instrumented range of 75 kilometers. Sentinel is capable of operating day or night, in adverse weather conditions, in the battlefield environments of dust, smoke, aerosols and enemy countermeasures. It provides 360-degree azimuth coverage for acquisition tracking. Sentinel contributes to the digital battlefield by automatically detecting, classifying, identifying and reporting targets (cruise missiles, unmanned aircraft systems, rotary wing and fixed wing aircraft). Sentinel acquires targets sufficiently forward of the battle area to allow weapons reaction time and engagement at optimum ranges. Sentinel's integrated IFF reduces the potential for fratricide of United States and Coalition aircraft.

The Sentinel A4 Active Electronically Scanned Array (AESA) is the next generation of radar technology to replace the current phase and frequency scanned array used by Sentinel today. Sentinel A4 hardware and software upgrades will extend the range for ground-based surveillance and situational awareness; will have faster and more accurate Non-Cooperative Target Recognition (NCTR) for clearing fires and preventing fratricide; will improve track accuracy, and management of larger track loads; and improve operation in severe/urban clutter. The system will provide simultaneous multi-mission capability and provides hemispherical surveillance to detect and track small targets, such as Unmanned Aircraft Systems (UAS) and Cruise Missiles, in clutter and will detect and track slow targets, such as UAS and Rotary Wing aircraft, at low altitudes in clutter. The system will detect, track, and classify RAM threats and will support AIAMD and Indirect Fire Protection Capability (IFPC) requirements with Fire Control quality tracks. Sentinel A4 will incorporate the upgraded AN//TPX-61 IFF with M-Code capability added by replacing the GB-Gram card with M-Code GB-Gram cards.

The Research and Development funding supports Sentinel modernization/upgrades to address obsolescence issues and capabilities gaps. Sentinel A4 modernization efforts will increase detection, recognition and identification range by 100%, add RAM detection, increase electronic protect and allow for system capability growth through Fiscal Year (FY) 2050 to address evolving threat.

FY 2022 Funds address the following:



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / <i>Radar Development</i>	<b>Project (Number/Name)</b> E10 / <i>Sentinel</i>
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The AESA (Sentinel A4) is the next generation of radar technology to replace the current phase and frequency scanned array used by Sentinel today. The AESA Antenna will provide increased capability including extended range for ground-based surveillance and situational awareness, faster and more accurate NCTR for clearing fires and preventing fratricide, improved Fire Control (FC) quality track accuracy, and management of larger track loads. The AESA will also provide improved operation in severe/urban clutter. The system will detect and track small targets, such as UAS and Cruise Missiles, in clutter and will detect and track slow targets, such as UAS and Rotary Wing (RW) aircraft, at low altitudes in clutter. The system will detect, track, and classify RAM threats and will support Integrated Air and Missile Defense Battle Command System (IBCS) requirements and can contribute sensor support for mitigating current and future Indirect Fire Protection Capability Increment 2 mission requirements. FY 2022 funding supports the build of five user operational evaluation systems which will allow for soldier feedback prior to Low Rate Initial Production (LRIP). These systems will also allow the AESA technology to be used to support engagements for emerging technologies. The Sentinel A4 will incorporate Mode S technologies.

Electronic Attack/Electronic Protect (EA/EP) addresses the electronic countermeasures (ECM) gap. This effort continues through the life of the radar, addressing both changing threats and electronic counter measure gaps.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Product Development</p> <p><b>Description:</b> Funding is provided for the following efforts:</p> <p><b>FY 2021 Plans:</b> Will complete procurement of material for Sentinel A4 Engineering and Manufacturing Development (EMD) assets and will begin integration of firmware, software and hardware for Sentinel A4 EMD assets. Will continue to perform technical assessments, concept studies, cost reduction, risk reduction, threat analysis, and required documentation for Sentinel A3.</p> <p><b>FY 2022 Plans:</b> Will continue integration of firmware, software and hardware for Sentinel A4 EMD assets. Will support build and integration of five (5) Sentinel A4 User Operational Evaluation Systems (UOES) to serve as soldier touch points for feedback prior to initiating Low Rate Initial Production (LRIP). Will provide UOES assets to support test events for emerging requirements. Will continue to perform technical assessments, concept studies, cost reduction, risk reduction, threat analysis, and required documentation for Sentinel A3</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase due to reprogramming to support full funding to build user operational evaluation systems for Sentinel A4 in FY 2022.</p>	89.771	102.259	120.737
<p><b>Title:</b> Test &amp; Evaluation</p> <p><b>Description:</b> Funding is provided for the following efforts:</p> <p><b>FY 2021 Plans:</b></p>	2.011	3.012	7.182

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / Radar Development	<b>Project (Number/Name)</b> E10 / Sentinel

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Will conduct software qualification test and hardware verification testing, field testing against representative targets. Prepare logistics products and required documentation for materiel release of software and hardware upgrades for Sentinel A3.			
<b>FY 2022 Plans:</b> Will conduct software qualification test and hardware verification testing, field testing against representative targets. Prepare logistics products and required documentation for materiel release of software and hardware upgrades for Sentinel A3. Supports Developmental Test for Sentinel A4 EMD assets.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to commencement of Developmental Testing for the Sentinel A4 program.			
<b>Accomplishments/Planned Programs Subtotals</b>	91.782	105.271	127.919

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• EF9: System Integration and Test	93.743	-	0.182	-	0.182	-	-	-	-	-	-
• EX2: Lower Tier Air Missile Defense (LTAMD) Capability	364.154	308.805	327.690	-	327.690	-	-	-	-	-	-
• C50016: System Integration and Test Procurement	107.157	-	-	-	-	-	-	-	-	-	-
• FM3: Future Interceptor	1.918	-	7.895	-	7.895	-	-	-	-	-	-
• C53101: MSE Missile	702.437	678.148	776.696	-	776.696	-	-	-	-	-	-
• EY7: IFPC Increment 2 - Block 1	186.369	153.362	233.512	-	233.512	-	-	-	-	-	-
• C62002: IFPC INC 2- I BLOCK 1 SYSTEM	9.337	62.461	25.253	-	25.253	-	-	-	-	-	-
• FI4: Maneuver - Short Range Air Defense (M-SHORAD)	41.690	4.813	39.376	-	39.376	-	-	-	-	-	-
• C14300: M-SHORAD - Procurement	233.300	517.287	331.575	-	331.575	-	-	-	-	-	-
• S40: Army Integrated Air and Missile Defense	211.634	206.850	157.873	-	157.873	-	-	-	-	-	-
• BZ5075: IAMD Battle Command System	29.629	198.587	301.872	-	301.872	-	-	-	-	-	-
• 0604741A: Air Defense Command, Control and Intelligence - Eng Dev	70.279	62.058	59.518	-	59.518	-	-	-	-	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / Radar Development	<b>Project (Number/Name)</b> E10 / Sentinel
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• AD5070: AIR & MSL Defense Planning & Control Sys	39.061	62.517	67.193	-	67.193	-	-	-	-	-	-

**Remarks**

These programs are an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

**D. Acquisition Strategy**

Sentinel A3 and its predecessors were procured from Raytheon as a non-developmental item. Raytheon owns the Technical Data Package (TDP) for the Sentinel A3 and its predecessors and therefore no other contractor has the technical ability to modify the Sentinel radar or Sentinel software. The modifications planned for the Sentinel that fall into this category are: Electronic Attack/Electronic Protect; Signal Data Processor; North Finding Module; Medium Bandwidth; Resiliency and Software Assurance Modification (RSAM); Counter Rocket Artillery and Mortar (C-RAM), Low Slow Small, Unmanned Aircraft Systems, Cruise Missiles; and Mode S.

For the Sentinel A4 modification, Lockheed Martin was competitively awarded a Fixed Price Incentive Firm (FPIF) contract to develop a modified Sentinel with a new Active Electronically Scanned Array (AESA) antenna.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / Radar Development	<b>Project (Number/Name)</b> E10 / Sentinel
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<b>Management Services (\$ 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			
Management Support	Various	Various : Multiple	8.494	4.015	Nov 2019	4.592	Nov 2020	4.679	Nov 2021	-		4.679	Continuing	Continuing	Continuing
<b>Subtotal</b>			8.494	4.015		4.592		4.679		-		4.679	Continuing	Continuing	N/A

<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			
Sentinel A3 Modifications	Various	Raytheon & Various : Fullerton, CA / Various	11.436	-		-		-		-		-	0.000	11.436	-
Electronic Attack/ Electronic Protect	Various	Raytheon & Various : Fullerton, CA / Various	21.502	4.357	Jan 2020	5.313	Jan 2021	5.327	Jan 2022	-		5.327	Continuing	Continuing	-
Active Electronically Scanned Array (A4)	C/FPIF	Lockheed Martin & Search, Track, Acquire, Radiate, Eliminate (PM STARE) : Syracuse, NY and Huntsville, AL	39.017	74.662	May 2020	91.160	Jan 2021	110.731	Jan 2022	-		110.731	Continuing	Continuing	-
Mode S	Various	Raytheon & Various : Fullerton, CA / Various	6.972	0.851	Jan 2020	-		-		-		-	0.000	7.823	-
Resiliency and Software Assurance Modification (RSAM) upgrade	Various	Raytheon & Various : Fullerton, CA / Various	-	2.209	Jan 2020	-		-		-		-	0.000	2.209	-
Counter Rocket Artillery and Mortars	Various	Raytheon & Various : Fullerton, CA / Various	-	3.677	Jan 2020	1.194	Jan 2021	-		-		-	0.000	4.871	-
<b>Subtotal</b>			78.927	85.756		97.667		116.058		-		116.058	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / Radar Development	<b>Project (Number/Name)</b> E10 / Sentinel
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<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			
Sentinel A3 Modifications	Various	Raytheon & Various : Fullerton, CA / Various	3.440	-		-		-		-		-	0.000	3.440	-
Electronic Attack/ Electronic Protect	Various	Raytheon & Various : Fullerton, CA / Various	3.959	0.765	Jan 2020	1.816	Jan 2021	0.840	Jan 2022	-		0.840	Continuing	Continuing	-
Mode S	Various	Raytheon & Various : Fullerton, CA / Various	2.486	0.526	Jan 2020	-		-		-		-	0.000	3.012	-
Resiliency and Software Assurance Modification (RSAM) upgrade	Various	Raytheon & Various : Fullerton, CA / Various	-	0.500	Jan 2020	-		-		-		-	0.000	0.500	-
Counter Rocket Artillery and Mortars	Various	Raytheon & Various : Fullerton, CA / Various	-	0.220	Jan 2020	1.196	Jan 2021	-		-		-	0.000	1.416	-
Active Electronically Scanned Array (A4)	C/FPIF	Lockheed Martin & Search, Track, Acquire, Radiate, Eliminate (PM STARE : Syracuse, NY and Huntsville, AL	-	-		-		6.342	Jan 2022	-		6.342	Continuing	Continuing	-
<b>Subtotal</b>			9.885	2.011		3.012		7.182		-		7.182	Continuing	Continuing	N/A

	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>	97.306	91.782	105.271	127.919	-	127.919	Continuing	Continuing	N/A

**Remarks**

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / Radar Development	<b>Project (Number/Name)</b> E10 / Sentinel
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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				
<b>Sentinel A3</b>																																
Electronic Attack/Electronic Protect (EA/EP)																																
EA/EP																																
Mode S																																
Mode S																																
Resiliency and Software Assurance Modification (RSAM) upg																																
RSAM																																
Counter Rocket Artillery and Mortars																																
C-RAM Mode																																
<b>Active Electronically Scanned Array (AESA) (A4)</b>																																
Engineering Manufacturing and Development Prototype Build and																																
EMD Prototype Build and Integration																																
Preliminary Design Review																																
1 PDR																																
Critical Design Review																																
2 CDR																																
Contractor Verification Testing																																
CVT																																
Developmental Test																																
Developmental Test																																
Limited User Testing																																
LUT																																
User Operational Evaluation System Build and Integration																																
UOES Build and Integration																																

**UNCLASSIFIED**

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / Radar Development	<b>Project (Number/Name)</b> E10 / Sentinel
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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
Initial Operational Test and Evaluation System Build and Integration  Initial Operational Test and Evaluation (IOT&E)																												

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604820A / <i>Radar Development</i>	<b>Project (Number/Name)</b> E10 / <i>Sentinel</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Sentinel A3	2	2019	4	2030
Electronic Attack/Electronic Protect (EA/EP)	2	2015	4	2030
Mode S	2	2018	4	2020
Resiliency and Software Assurance Modification (RSAM) upgrade	4	2019	4	2020
Counter Rocket Artillery and Mortars	2	2020	4	2021
Active Electronically Scanned Array (AESA) (A4)	4	2019	4	2033
Milestone B	4	2019	4	2019
Engineering Manufacturing and Development Prototype Build and Integration	2	2020	2	2022
Preliminary Design Review	2	2020	2	2020
Critical Design Review	2	2021	2	2021
Contractor Verification Testing	4	2021	2	2022
Developmental Test	2	2022	3	2023
Limited User Testing	4	2023	4	2023
User Operational Evaluation System Build and Integration	2	2022	3	2023
Initial Operational Test and Evaluation System Build and Integration	3	2023	4	2024
Initial Operational Test and Evaluation (IOT&E)	4	2024	2	2025



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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / <i>General Fund Enterprise Business System (GFEBS)</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	-	41.119	15.428	17.623	-	17.623	-	-	-	-	-	-
DV6: <i>General Fund Enterprise Business System</i>	-	34.310	4.913	5.047	-	5.047	-	-	-	-	-	-
GF5: <i>General Fund Enterprise Business System</i>	-	6.809	10.515	12.576	-	12.576	-	-	-	-	-	-

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

General Fund Enterprise Business System (GFEBS) undertakes necessary efforts to integrate, implement, and build the next generation of Enterprise Business Systems capabilities. This effort is required to develop a converged, modernized Enterprise Resource Planning system that streamlines and integrates the Army's core business functions.

GFEBS must take critical steps towards integration and implementation of the next generation of Enterprise Business Systems capabilities. This effort will address the obsolescence of existing SAP Enterprise Resource Planning (ERP) logistics and financial management platforms that the vendor plans to sunset by FY 28. GFEBS' modernization work sets the conditions for development of a converged, post-modern Defense Business System that streamlines and integrates the Army's core business functions.

GFEBS must identify redundant processes as candidates for business process re-engineering. Funding will support the 1) market research of Industry best practices, 2) Initiation of an Army Enterprise Development Environment to enable prototyping which reduces risk by aiding the requirements development. This environment includes: Cloud-hosted infrastructure, applications, and programs and tools, 3) government Program Management and Systems Engineering and Technical Assistance (SETA) contractors needed to plan for and manage the initiation of the post-modern system implementation effort.

DV6 - General Fund Enterprise Business System-Sensitive Activities (GFEBS-SA): GFEBS-SA is a designated National Security System (NSS) leveraging the GFEBS base system as the Army's core financial management system certified by the Chief Financial Officers Council. To protect sensitive information and enable clean auditability, the Army requires a separate instance of GFEBS operated on a secure network for processing sensitive and classified financial transactions that cannot be processed in the fully-fielded GFEBS base system without compromising classified information or missions, or endangering soldiers. Therefore, GFEBS-SA is an essential financial program designed to enable the auditability that is needed to comply with the Chief Financial Officers (CFO) Act, the Federal Financial Management Improvement Act (FFMIA), and prevent compromise of data that could cause grave harm to U.S. forces. GFEBS-SA is envisioned as a fully functional GFEBS application operated on a Secure Internet Protocol Router Network (SIPR), leveraging off of the sustained system design while providing additional implementation that includes additional requirements designed to protect sensitive intelligence operations and special operations missions. It processes Secret Collateral and below information while providing GFEBS capabilities such as distribution and execution of appropriated funds, cost management, financial reporting, and asset management. GFEBS-SA will be implemented and deployed to 3,000 users across 150 locations worldwide. GFEBS-SA supports information exchanges with organizations that support the Army's sensitive activities mission, including cross-security domain integration between Secure Internet Protocol Router Network (SIPR) and Non-Classify

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / <i>General Fund Enterprise Business System (GFEBS)</i>
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Internet Protocol Router Network (NIPR) with GFEBS and other system partners. Services are capable of being upgraded throughout the life of the program in order to incorporate advances in best business practices and technology, and will modify capability to maintain a synchronized software baseline with the GFEBS base system to maintain efficiencies in capability enhancements, training documentation, and sustainment support. The GFEBS-SA system achieved Full Deployment in fiscal year (FY) 2021. The FY 2022 Research, Development, Test and Evaluation (RDTE) funding requested will fund system upgrades and enhancements to ensure synchronization between the GFEBS-SA system and the GFEBS base system in order to meet mandatory data exchange and interface requirements. FY 2022 funding supports continuous enhancements to the GFEBS-SA data protection and partitioning software as other SIPR capabilities are brought online, critical to ensuring appropriate security measures are in place to protect sensitive activity data.

GF5 - General Fund Enterprise Business System (GFEBS): GFEBS is the Army's core financial management system for administering its General Fund. Full Deployment was reached in 2012 and the system is currently in the Capability Support (sustainment) phase of the Business Acquisition Cycle, focused on modernization, cyber security, and system enhancements while also conducting capability enhancements to meet policy and deliver accurate Army financial information. GFEBS was implemented to fulfill the needs and enable the Army to comply with the Federal Financial Management, deployed to over 35,000 users across 200 locations worldwide. GFEBS was developed using a commercial off-the-shelf Enterprise Resource Planning system that is certified by the Chief, Financial Officer Council and provides six core financial functions (United States General Ledger (USGL), Cost Management, Funds Control, Payable Management, Real Property, Receivable Management and Reports).

GFEBS RDTE funds capability enhancements designed to meet audit readiness standards and continue to make system changes as prioritized by the functional sponsor and user community through the Tactical Financial Information Council, a Senior Executive Service/General Officer-level board. The RDTE funding will support the increase in mission performance and improvement of automated system processes. Continue efforts to support modernization efforts aligned with the Original Equipment Manufacturer's Systems Applications and Products (SAP) next generation capability, activities include code de-customization, data enablement, and improved automated data access to prevent end of support for the current database and platform. Funds will also support acquisition trades and market research on alternatives for SAP based finance/logistics consolidation to evaluate potential efficiencies by reducing platforms and licenses. FY 2022 RDTE funds will be utilized to conduct system enhancements, including G-Invoicing necessary to meet OSD and Army data exchange and interface requirements. The additional capability will support both compliancy to meet audit requirements and updated interfaces to replace sun-setting systems.

<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	42.883	21.201	14.804	-	14.804
Current President's Budget	41.119	15.428	17.623	-	17.623
Total Adjustments	-1.764	-5.773	2.819	-	2.819
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-5.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.764	-0.773			
• Adjustments to Budget Years	-	-	2.819	-	2.819

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)				<b>Project (Number/Name)</b> DV6 / General Fund Enterprise Business System			
<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>
DV6: General Fund Enterprise Business System	-	34.310	4.913	5.047	-	5.047	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

DV6 - General Fund Enterprise Business System-Sensitive Activities (GFEBS-SA): GFEBS-SA is a designated National Security System (NSS) leveraging the GFEBS base system as the Army's core financial management system certified by the Chief Financial Officers Council. To protect sensitive information and enable clean auditability, the Army requires a separate instance of GFEBS operated on a secure network for processing sensitive and classified financial transactions that cannot be processed in the fully-fielded GFEBS base system without compromising classified information or missions, or endangering soldiers. Therefore, GFEBS-SA is an essential financial program designed to enable the auditability that is needed to comply with the Chief Financial Officers (CFO) Act, the Federal Financial Management Improvement Act (FFMIA), and prevent compromise of data that could cause grave harm to U.S. forces. GFEBS-SA is envisioned as a fully functional GFEBS application operated on a Secure Internet Protocol Router Network (SIPR), leveraging off of the sustained system design while providing additional implementation that includes additional requirements designed to protect sensitive intelligence operations and special operations missions. It processes Secret Collateral and below information while providing GFEBS capabilities such as distribution and execution of appropriated funds, cost management, financial reporting, and asset management. GFEBS-SA will be implemented and deployed to 3,000 users across 150 locations worldwide. GFEBS-SA supports information exchanges with organizations that support the Army's sensitive activities mission, including cross-security domain integration between Secure Internet Protocol Router Network (SIPR) and Non-Classify Internet Protocol Router Network (NIPR) with GFEBS and other system partners. Services are capable of being upgraded throughout the life of the program in order to incorporate advances in best business practices and technology, and will modify capability to maintain a synchronized software baseline with the GFEBS base system to maintain efficiencies in capability enhancements, training documentation, and sustainment support. GFEBS-SA system reached Full Deployment in FY21. The fiscal year (FY) 2022 Research, Development, Test and Evaluation (RDTE) funding requested will complete system upgrades and enhancements, which will re-synchronize the system baseline with the GFEBS base system to account for any capability upgrades that were made to the base system while GFEBS-SA was in development. Both GFEBS and GFEBS-SA must remain consistent.

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

<b>Title:</b> Software Development	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Description:</b> Software development includes all RDTE activities related to the development of the GFEBS-SA system itself. This includes the systems engineering management, planning, and blueprinting as well as the system integrator putting hands on keyboards to integrate the GFEBS solution into the Secret (SIPR) environment to include developing the required interfaces to allow GFEBS-SA to interact with partner systems; and the hardware and software tools necessary to facilitate development. After Full Deployment occurs in FY 2021, RDTE funding is required to allow the GFEBS-SA system capability to remain synchronized with the base GFEBS system. General Fund Enterprise Business System (GFEBS) undertakes necessary efforts to integrate, implement, and build the next generation of Enterprise Business Systems capabilities.	17.683	4.913	5.047

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> DV6 / General Fund Enterprise Business System

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> In FY 2021 the GFEBS-SA system will reach Full Deployment and the RDTE funding requested will complete system upgrades and enhancements which will re-synchronize the system baseline with the GFEBS base system to account for any capability upgrades and platform modernization that were made to the base system while GFEBS-SA was in deployment. This synchronization allows GFEBS to remain on-track in meeting Congressionally-mandated auditability requirements. Additionally, funds support efforts to integrate sensitive activity capability across the Enterprise.</p> <p><b>FY 2022 Plans:</b> In FY 2022, RDTE funding will ensure synchronization of the GFEBS-SA system and GFEBS base system, which reduces sustainment costs through shared development across two Enterprise Resource Planning (ERP) baselines. Additionally, funds support efforts to integrate sensitive activity capability across the Enterprise and maintain security posture through data partitioning and protection software enhancements.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> GFEBS-SA achieved Full Deployment in FY21 but will continue to upgrade and enhance the system to ensure appropriate data protection and partitioning are in place as the GFEBS-SA and GFEBS base systems are continuously synchronized.</p>			
<p><b>Title:</b> Testing</p> <p><b>Description:</b> Testing includes all efforts related to test planning, Developmental Testing (DT), User Acceptance Testing (UAT), Operational Test &amp; Evaluation (OT&amp;E), and the system integrator labor and site services aligned with each.</p>	3.982	-	-
<p><b>Title:</b> Program Support</p> <p><b>Description:</b> Program Support includes program management and training activities. Costs include government management and travel, facilities, and development of recurring training materials.</p>	3.309	-	-
<p><b>Title:</b> Data Center Hosting</p> <p><b>Description:</b> Data center hosting includes all costs associated with hosting of each environment in the Cloud; which include pre-development, staging, production, continuity of operations (COOP), Quality Assurance, and program management tools. Other resources included in these costs are HANA, the cross-domain investment, and the SIPR circuit Attribute Based Access Control (ABAC) data hosting.</p>	9.336	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	34.310	4.913	5.047

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> DV6 / General Fund Enterprise Business System
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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	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
• B5511: GFEBS SENSITIVE ACTIVITIES	11.248	-	-	-	-	-	-	-	-	-	-

**Remarks**

GFEBS-SA will be fully deployed in FY 2021; therefore, there are no procurement dollars budgeted in the GFEBS-SA line for FY 2021 and beyond. GFEBS base program procurement dollars will be used to prevent end of service life by the Original Equipment Manufacturer, SAP, and enable a migration of the GFEBS-SA database from Oracle to SAP as part of the synchronization between GFEBS and GFEBS-SA in FY2021. Additionally, procurement funds will be leveraged to support deployments in conjunction with GFEBS-SA Full Deployment schedule to sites not currently running the GFEBS base system.

GFEBS-SA OMA requirements begin in FY 2021, which is the scheduled Full Deployment date. These requirements will be incorporated into the GFEBS base system Future Years Defense Program (FYDP) request. GFEBS-SA was deployed in DEC 2020, OMA requirements are funded in GFEBS OMA APE 43800100.

**D. Acquisition Strategy**

Plan, develop, and manage GFEBS-SA as a separate instance from GFEBS base program on the SIPRNet to support delivery of capabilities for this designated National Security System (NSS) in support of the sensitive activity commands. The GFEBS-SA solution was acquired as a sole source contract with Accenture Federal Services as a single increment. The contract is a hybrid of Firm Fixed Price and Cost Plus Fixed Fee CLINs to support development efforts and to encourage Accenture Federal Services to deliver a solution in support of the Vice Chief of Staff of the Army recommendation to accelerate the schedule to ensure operational security and Army audit requirements. The contract was awarded in April 2017.

Software is being developed through a single build to achieve full capability. GFEBS-SA will consist of a single software release delivered in a limited deployment to the Initial Operational Test and Evaluation (IOT&E) unit, followed by a full deployment to all other users upon successful completion of IOT&E.

The program will require modernization enhancements after full deployment. These modernization enhancements will require a stream of RDT&E funding to keep the GFEBS-SA system synchronized with the base system by making modifications needed for audit readiness, compliance, and upgrades required to keep the system up-to-date with SAP standards and Functional Governance Board requirements.

Capability Support functions of all prioritized system enhancements for the GFEBS and GFEBS-SA systems will be transitioned to Army Shared Services Center starting in FY 2021.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> DV6 / General Fund Enterprise Business System
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<b>Management Services (\$ 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			
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	0.152		-		-		-		-	0.000	0.152	-
<b>Subtotal</b>			-	0.152		-		-		-		-	0.000	0.152	N/A

<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			
Product Development	SS/ Various	Accenture Federal LLC : Alexandria, VA	53.679	17.531	Mar 2020	4.913	Oct 2020	-		-		-	20.227	96.350	88.300
ASSC - Sustain/Capability Support Effort	TBD	TBD : TBD	-	-		-		5.047	Oct 2021	-		5.047	0.000	5.047	-
Data Center Hosting	TBD	Defense Information Systems Agency : Ft. Meade, MD	16.087	9.336	Oct 2019	-		-		-		-	0.000	25.423	-
<b>Subtotal</b>			69.766	26.867		4.913		5.047		-		5.047	20.227	126.820	N/A

**Remarks**  
 The current contract is a hybrid of FFP, CPFF, and CR CLINs for system development, landscape configuration, test and evaluation, solution delivery, and certification/ accreditation.  
 Beginning in FY 2022 GFEBS-SA system enhancement work will utilize Army Shared Serviced Center Unified contract.  
 Cost to Complete assumes a service life through FY 2030. Some of this support will take place on a follow-on contract.

<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			
Support Costs	Various	PdM GFEBS SA : Arlington, VA	26.708	3.309	Oct 2019	-		-		-		-	0.000	30.017	-
<b>Subtotal</b>			26.708	3.309		-		-		-		-	0.000	30.017	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> DV6 / General Fund Enterprise Business System

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
Current Contract	Current Contract																											
Limited Deployment ATP	▲ 1																											
Deployment					■ Limited Deployment																							
Operational Testing					■ OT																							
Full Deployment ATP					▲ 2																							
Full Deployment					■ Full Deployment																							
Capability Support ATP					▲ 3																							
Transition to Army Shared Services Center (ASSC)					■ Transition to Army Shared Services Center (ASSC)																							
Capability Support					Capability Support (OMA)																							
Continuous Process & Product Improvement					Continuous Process & Product Improvements (RDTE)																							
Initial Re-synchronization w/ GFEBS Baseline									■ Initial Re-synchronization w/ GFEBS Baseline (RDTE)																			



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> DV6 / General Fund Enterprise Business System

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Development	1	2019	4	2019
ATP - Solution Development	4	2019	4	2019
Current Contract	1	2020	3	2021
Limited Deployment ATP	3	2020	3	2020
Deployment	3	2020	1	2021
Operational Testing	4	2020	4	2020
Full Deployment ATP	4	2020	4	2020
Full Deployment	1	2021	1	2021
Capability Support ATP	2	2021	2	2021
Transition to Army Shared Services Center (ASSC)	3	2021	4	2021
Capability Support	3	2021	4	2025
Continuous Process & Product improvement	3	2021	4	2025
Initial Re-synchronization w/ GFEBS Baseline	1	2022	3	2022

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)				<b>Project (Number/Name)</b> GF5 / General Fund Enterprise Business System			
<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>
GF5: General Fund Enterprise Business System	-	6.809	10.515	12.576	-	12.576	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

GF5 - General Fund Enterprise Business System (GFEBS): GFEBS is the Army's core financial management system for administering its General Fund. Full Deployment was reached in 2012 and the system is currently in the Capability Support (sustainment) phase of the Business Acquisition Cycle, focused on modernization, cyber security, and system enhancements while also conducting capability enhancements to meet policy and deliver a more accurate picture of Army financial awareness. GFEBS was implemented to fulfill the needs and enable the Army to comply with the Federal Financial Management, it is utilized by over 35,000 users across 200 locations worldwide. GFEBS was developed using a commercial off-the-shelf Enterprise Resource Planning system that is certified by the Chief, Financial Officer Council and provides six core financial functions (United States General Ledger (USGL), Cost Management, Funds Control, Payable Management, Real Property, Receivable Management and Reports).

GFEBS Research, Development, Test and Evaluation (RDTE) funding in fiscal year (FY) 2022 support the completion of the audit-related system enhancements which will give the Army an auditable financial system designed to meet audit readiness standards as outlined by the United States Government Accountability Office, as well as support the continuation of system changes as prioritized by the functional sponsor and user community through the Tactical Financial Information Council, a Senior Executive Service/General Officer-level board. The FY 2022 funding continues to support increases in mission performance and improvement of automatized system processes. Continue efforts to support modernization efforts aligned with the Original Equipment Manufacturer's Systems Applications and Products (SAP) next generation capability, activities include code de-customization, data enablement, and improved automated data access to prevent end of support for the current database and platform. Funds will also support acquisition trades and market research on alternatives for SAP based finance/logistics consolidation to evaluate potential efficiencies by reducing platforms and licenses.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Capability Enhancement	6.809	10.515	12.576
<b>Description:</b> Capability enhancements provide changes to the system that are needed to update the infrastructure as required to meet system requirements and best practices, and to support evolving statutory and regulatory requirements. The capability enhancement initiatives are needed to increase the GFEBS capability and performance to maintain compliance with Federal Financial Management Improvement Act (FFMIA), Business Enterprise Agency (BEA), Standard Financial Information Structure (SFIS) requirements, and Yellow Book auditability. These requirements are established and prioritized through a General Officer (GO)/Senior Executive Service (SES)-level Tactical Financial Information Council and Functional Governance Board.			
<b>FY 2021 Plans:</b>			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> GF5 / General Fund Enterprise Business System

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

	FY 2020	FY 2021	FY 2022
<p>The RDTE funds requested in FY 2021 support the additional focus on completing the audit-related system enhancements which will give the Army an auditable financial system designed to meet Yellow Book audit readiness standards as outlined by the United States Government Accountability Office, as well as support the continuation of system changes as prioritized by the functional sponsor and user community through the Process Owners Group, a Senior Executive Service/General Officer-level board. The GFEBS Process Owners Group and Functional Governance Board have developed a list of enhancement items and have put the highest priority on those items which enable an audit-ready Army, ensure a modern and sustainable system, and enable the retirement of legacy systems freeing up funding for investment into the modern ERPs. Specifically, the additional enhancements will improve the Army's fund balance with Treasury reducing service provider personnel needed to support reconciliation activities. This allows the Army to focus resources on mission critical activities. The funding also supports modernization efforts aligned with the Original Equipment Manufacturer's (SAP) next generation capability. The modernization activities include code de-customization, data enablement, and improved automated data access to prevent end of support for the current database and platform.</p> <p><b>FY 2022 Plans:</b> The RDTE funds requested in FY 2022 support the completion of the audit-related system enhancements which will give the Army an auditable financial system designed to meet audit readiness standards as outlined by the United States Government Accountability Office, as well as support the continuation of system changes as prioritized by the functional sponsor and user community through the Tactical Financial Information Council, a Senior Executive Service/General Officer-level board. The FY 2022 funding continues to support increases in mission performance and improved automated system processes. Continue efforts to support modernization efforts aligned with the Original Equipment Manufacturer's (SAP) next generation capability, activities include code de-customization, data enablement, and improved automated data access to prevent end of support for the current database and platform. Funds will also support acquisition trades and market research on alternatives for SAP based finance/logistics consolidation to evaluate potential efficiencies by reducing platforms and licenses.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2021 to FY 2022 increasing due to required functional enhancements. As GFEBS moves through sustainment, the program focus is on developing a modernized system.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	6.809	10.515	12.576

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BE4168: General Fund Enterprise Business System	3.754	4.448	1.452	-	1.452	-	-	-	-	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> GF5 / General Fund Enterprise Business System

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OMA - ERPE-ERPA / 438001000 / 5T0: GFEBS OMA	-	-	82.315	-	82.315	-	-	-	-	-	-

**Remarks**

OPA - FY 2022 Procurement dollars support new software upgrades to bring GFEBS reporting and analytics in-line with processing performance thresholds established in the GFEBS Authority to Proceed (ATP) and to modernize the system in order to remain current with new technology standards.

OMA - GFEBS OMA funding in FY 2020 is \$93.706 million and in FY 2021 is \$97.085 million. FY 2022 and beyond OMA dollars include funding for both GFEBS and GFEBS-SA programs. OMA-funded support includes cloud hosting, software/hardware maintenance, capability support, and capability enhancements.

**D. Acquisition Strategy**

GFEBS is currently in the Capability Support (sustainment) phase as specified in DoDI 5000.75. On 15 January 2018, the responsibility for system support of the GFEBS system transitioned from the original developer contract to a contract created to focus more on sustainment support and cost control. The current sustainment contract provides specific contracting methodologies to track all capability support functions as well as all the system enhancement requirements as set forth by the user community through the Process Owners Group; a Senior Executive Service/General Officer-level board that prioritizes user needs. Many of these enhancements require RDT&E funding as determined through a set of established business rules.

Capability Support functions of all prioritized system enhancements for the GFEBS and GFEBS-SA systems will be transitioned to Army Shared Services Center starting in FY 2021.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> GF5 / General Fund Enterprise Business System
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	-	0.030		-		-		-		-	0.000	0.030	-
<b>Subtotal</b>			-	0.030		-		-		-		-	0.000	0.030	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Development	Option/Various	IBM Corp : Bethesda, Maryland	132.072	6.779	Jan 2020	10.515	Nov 2020	-		-		-	Continuing	Continuing	185.769
ASSC - Sustain/Capability Support Effort	TBD	TBD : TBD	-	-		-		12.576	Oct 2021	-		12.576	Continuing	Continuing	-
<b>Subtotal</b>			132.072	6.779		10.515		12.576		-		12.576	Continuing	Continuing	N/A

**Remarks**  
 Total value of contract includes capability support (OMA) and enhancement services through January 15, 2023.  
 Beginning in FY 2022 GFEBS system enhancement work will utilize Army Shared Serviced Center Unified contract.

	<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>
<b>Project Cost Totals</b>	132.072	6.809	10.515	12.576	-	12.576	Continuing	Continuing	N/A

**Remarks**

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> GF5 / General Fund Enterprise Business System	

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
Sustainment Contract w/ Capability Enhancement Task Order (Current)	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
Capability Support transitioned to ASSC	[Redacted]				1 Capability Support transitioned to ASSC				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
Army Shared Services Sustainment w/ Capability Enhancement Option (Follow-on)	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
System Enhancements FY20	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
System Enhancements & Modernization FY21	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
System Enhancements & Modernization FY22	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
System Enhancements & Modernization FY23	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
System Enhancements & Modernization FY24	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							
System Enhancements & Modernization FY25	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]							

**Note**  
System enhancements include prioritized capabilities based on functional needs in areas such as Audit Enablement and Compliance, Cash Accountability, Improved Funds Balance with Treasury, Cost of Army Operations, and Financial Reporting and Analytics.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604822A / General Fund Enterprise Business System (GFEBS)	<b>Project (Number/Name)</b> GF5 / General Fund Enterprise Business System

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Map/Blueprint/Build Release 1.1	4	2005	3	2006
MS B1	1	2008	1	2008
Realization - Release 1.2	4	2006	1	2009
IOC	3	2009	3	2009
Release 1.3 - Replace STANFINS	1	2008	1	2011
Full Deployment Decision Review	3	2009	3	2009
Release 1.4: Replace SOMARDS	4	2008	1	2011
Full Deployment Decision Review 2	1	2010	1	2010
Hardware Fielding	1	2009	1	2011
Full Deployment	4	2012	4	2012
Sustainment Contract w/ Capability Enhancement Task Order (Current)	2	2018	2	2022
Capability Support transitioned to ASSC	4	2021	4	2021
Army Shared Services Sustainment w/ Capability Enhancement Option (Follow-on)	2	2022	4	2025
Capability Enhancements FY18	1	2018	4	2018
System Enhancements FY19	1	2019	4	2019
System Enhancements FY20	1	2020	4	2020
System Enhancements & Modernization FY21	1	2021	4	2021
System Enhancements & Modernization FY22	1	2022	4	2022
System Enhancements & Modernization FY23	1	2023	4	2023
System Enhancements & Modernization FY24	1	2024	4	2024
System Enhancements & Modernization FY25	1	2025	4	2025

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</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	-	16.583	18.278	-	-	-	-	-	-	-	-	-
L86: <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</i>	-	4.711	5.179	-	-	-	-	-	-	-	-	-
L88: <i>Enhanced AN/TPQ 36</i>	-	11.872	13.099	-	-	-	-	-	-	-	-	-

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

The Research Development Test & Evaluation (RDT&E) funds for the AN/TPQ-50 and AN/TPQ-53 programs fund the design, development and test of primary efforts. The programs directly support the prioritization, tracking and locating of targets, and dissemination of that information for simultaneous attack of multiple threats. They provide the Warfighter with continuous and responsive counterfire target acquisition systems for all types and phases of military operations. Project L86, Lightweight Counter Mortar Radar (LCMR), version AN/TPQ-50 provides 360 degrees of azimuth coverage from ranges of 500 meters to 10 kilometers. Project L88, AN/TPQ-53 is a highly mobile radar system that leverages the latest in technology design to accelerate modernization and increase range while improving false location rate, reducing obsolescence and increasing reliability. The AN/TPQ-53 provides a system with increased range and accuracy throughout a 90 degree search sector (stare mode) as well as 360 degree coverage (rotating) for locating mortar, artillery and rocket firing positions. The AN/TPQ-50 and AN/TPQ-53 radars are currently fielded to multiple Continental United States (CONUS) and Outside Continental United States (OCONUS) locations to include operational support to Operation Inherent Resolve (OIR) and Operation Freedom's Sentinel (OFS).

Starting in fiscal year (FY) 2022, all AN/TPQ-53 modernization development efforts including requirements addressing multi-domain operations (MDO) digitization and new and emerging threats will take place in the associated modification-in-service line, program element (PE) 0607148A.

<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	17.294	20.008	11.717	-	11.717
Current President's Budget	16.583	18.278	0.000	-	0.000
Total Adjustments	-0.711	-1.730	-11.717	-	-11.717
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-1.000	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-0.711	-0.730	-	-	-
• Adjustments to Budget Years	-	-	-11.717	-	-11.717



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

**Appropriation/Budget Activity**  
2040: *Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)*

**R-1 Program Element (Number/Name)**  
PE 0604823A / *Firefinder*

**Change Summary Explanation**

AN/TPQ-53: FY 2022 funds moved from this program element (PE) to the associated modification-in-service line, PE 0607148A.  
AN/TPQ-50: \$2.764 million reduction of FY 2022 funds.

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>				<b>Project (Number/Name)</b> L86 / <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</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>
L86: <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</i>	-	4.711	5.179	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The AN/TPQ-50 Lightweight Counter Mortar Radar (LCMR) is a highly mobile radar that automatically detects, classifies, tracks, and locates the point of origin of projectiles fired from mortar, artillery, and rocket systems with sufficient accuracy for first round fire for effect. It mitigates close combat radar coverage gaps by providing 360 degrees of azimuth coverage from ranges of 500 meters to 10 kilometers and is capable of being deployed in two configurations, standalone or vehicle mounted. The AN/TPQ-50 system interoperates with mission command systems to provide the maneuver commander increased counterfire radar flexibility. The AN/TPQ-50 is deployed as part of the Counter-Rocket, Artillery, Mortar (C-RAM) system of systems. It provides data to the Forward Area Air Defense Command and Control (FAAD C2) node for the sense and warn force protection capability. The AN/TPQ-50 is currently fielded to multiple Continental United States (CONUS) and Outside Continental United States (OCONUS) locations including support to Operation Inherent Resolve (OIR), Operation Freedom's Sentinel (OFS), and Joint Urgent Operational Need (JUON) 0558 which provides simultaneous air surveillance and counter target acquisition (CTA) capabilities .

The fiscal year (FY) 2021 funds of \$5.179 million continue development required to address electronic protection against cyber electromagnetic activity (CEMA) and threats identified in the Validated Online Lifecycle Threat (VOLT) report. This funding enables the program to develop and integrate sensor protect capabilities into the software baseline, develop advanced protection techniques which take advantage of hardware upgrades, and develop documentation for hardware and software capability improvements in support of multi-domain operations against peer and near-peer threats. Funding supports associated test costs and program support.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Modernization & Emerging Threats	4.711	5.179	-
<b>Description:</b> Funding supports software updates required to address electronic protection and mitigate the effects of electromagnetic interference (EMI) and combat CEMA. These capabilities address vulnerabilities identified in the bi-annual release of the VOLT and changes on the battlefield due to new tactics, techniques, and procedures (TTPs) and/or areas of operation.			
<b>FY 2021 Plans:</b> Funding increases the scope of work required to enhance the AN/TPQ-50's ability to address electronic protection against CEMA and new threats identified in the VOLT report as well as associated test efforts and program support. These efforts are executed by the LCMR program.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 has no planned funds for execution.			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L86 / <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
FY 2021 Base procurement funds in the amount of \$5.332 million will support the fielding of software to systems supporting United States Army units, engineering changes, information assurance and program support			
<b>Accomplishments/Planned Programs Subtotals</b>	4.711	5.179	-

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

<b>Line Item</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>
• B05201: <i>Lightweight Counter Mortar Radar</i>	5.400	5.332	-	-	-	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The AN/TPQ-50 Lightweight Counter Mortar Radar was developed in 2009 to meet Training and Doctrine Command (TRADOC) Capabilities Production Document (CPD) requirements. The program achieved a full rate production (FRP) decision on 21 June 2013. The AAO increased from 400 to 452 systems in January 2019; 400 systems procured to date. The AN/TPQ-50 program transitioned into the sustainment phase on 1 October 2019.

Research, Development, Test and Evaluation (RDT&E) funding supports modernization development task orders under the national maintenance contract (NMC).

The FY 2021 funds of \$5.179 million continue development required to address electronic protection against CEMA and threats identified in Validated Online Lifecycle Threat (VOLT) report. This funding enables the program to develop and integrate sensor protect capabilities into the software baseline, develop advanced protection techniques which take advantage of hardware upgrades, and develop documentation for hardware and software capability improvements in support of multi-domain operations to address peer and near-peer threats. Funding supports associated test costs and program support.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L86 / <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</i>
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<b>Management Services (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management (Government Support)	Various	Various : Activities	2.114	0.427	Nov 2019	0.325	Feb 2021	-		-		-	0.000	2.866	-
Program Management (Contractor Support)	C/CPFF	Various : APG, MD	0.979	-		-		-		-		-	0.000	0.979	-
<b>Subtotal</b>			3.093	0.427		0.325		-		-		-	0.000	3.845	N/A

<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Modernization & New and Emerging Threats	SS/CPFF	Various : Various	6.484	3.773	Nov 2019	2.405	Jan 2021	-		-		-	0.000	12.662	-
<b>Subtotal</b>			6.484	3.773		2.405		-		-		-	0.000	12.662	N/A

<b>Test and Evaluation (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Test Support (Government)	Various	Various : Activities	6.000	0.511	Nov 2019	2.449	Nov 2021	-		-		-	0.000	8.960	-
<b>Subtotal</b>			6.000	0.511		2.449		-		-		-	0.000	8.960	N/A

<b>Project Cost Totals</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>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
	15.577	4.711	5.179	-	-	-	0.000	25.467	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>			<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L86 / <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</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
Modernization and Emerging Threats - Fiscal Year FY 2019 VOLT	██████████				██████████																							
Modernization Testing - FY 2019 VOLT	██████████				██████████				██████████																			
Modernization, Emerging Threats, and Testing - FY 2021 VOLT					██████████				██████████																			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L86 / <i>LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Modernization and Emerging Threats - Fiscal Year FY 2019 VOLT	1	2019	1	2021
Modernization Testing - FY 2019 VOLT	1	2020	1	2022
Modernization, Emerging Threats, and Testing - FY 2021 VOLT	1	2021	4	2022

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

<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>				<b>Project (Number/Name)</b> L88 / <i>Enhanced AN/TPQ 36</i>			
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
L88: <i>Enhanced AN/TPQ 36</i>	-	11.872	13.099	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Enhanced AN/TPQ-36 (AN/TPQ-53) Counterfire Target Acquisition Radar System is a highly mobile radar set that automatically detects, classifies, tracks, and locates the point of origin of projectiles fired from mortar, artillery, and rocket systems with sufficient accuracy for first round fire for effect. It mitigates close combat radar coverage gaps by providing a 90 degree search sector (stare mode) as well as 360 degree coverage (rotating) and replaces the AN/TPQ-36 and AN/TPQ-37 Firefinder Radars. The AN/TPQ-53 system interoperates with mission command systems to provide the maneuver commander increased counterfire radar flexibility. The AN/TPQ-53 is deployed as part of the Counter-Rocket, Artillery, Mortar (C-RAM) system of systems. It provides data to the Forward Area Air Defense Command and Control (FAAD C2) node for the sense and warn force protection capability. The AN/TPQ-53 currently supports contingency operations to include Operation Inherent Resolve (OIR) and is fielded to Brigade Combat Teams (BCTs), Field Artillery Brigades (FABs) and Division Artilleries (DIVARTYS).

Starting in FY 2022, all modernization efforts including requirements addressing multi-domain operations (MDO) digitization and digital distributed receiver exciter (DDREX), electronic protection and emerging threats will take place in the program's associated modification-in-service line, program element (PE) 0607148A.

The FY 2021 funds of \$13.099 million supports ongoing test efforts, Army interoperability certifications (AICs), and the development and testing of modernization efforts to address extended range, electronic protection, and emerging threats in support of multi-domain operations against peer and near-peer threats. These efforts include the performance of technical assessments, engineering studies, risk reduction and required documentation.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Electronic Protection and Emerging Threats	2.175	8.579	-
<b>Description:</b> This effort improves spectrum management and mitigates electromagnetic interference (EMI) from commercial and military bands. This effort also develops and improves radar electronic protection (EP) algorithms which counter electronic threats. Lastly, this effort funds the development of capabilities to address emerging threats identified in the biennial release of the Validated Online Lifecycle Threat (VOLT) report and changes on the battlefield due to new adversarial tactics, techniques, and procedures (TTPs) and/or areas of operation.			
<b>FY 2021 Plans:</b> Continue development and testing of additional electronic protection techniques to mitigate cyber electromagnetic activity (CEMA) in peer and near peer threat environments. Continue development of capabilities to address emerging threats identified in the biennial release of the VOLT and conflict areas of operation. Implement tools and TTPs to allow the radar to operate more			

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L88 / <i>Enhanced AN/TPQ 36</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
efficiently in the presence of electromagnetic interference (EMI). Funding supports associated developmental testing and program support. The Enhanced AN/TPQ-36 program will execute the funds.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 has no funds planned for execution. Starting in FY 2022, all modernization efforts including requirements addressing electronic protection and emerging threats will take place in the program's associated modification-in-service line, program element (PE) 0607148A.				
<b>Title:</b> Extended Range  <b>Description:</b> This effort extends the radar's detection and identification range through associated development, integration, and testing in support of the Army's number one modernization priority of long range precision fires (LRPF).  <b>FY 2021 Plans:</b> Funds support the development, integration and testing of further refinements and upgrades to the extended range capability in support of LRPF cross functional team (CFT) efforts to shoot and detect farther.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 has no funds planned for execution. Starting in FY 2022, all modernization efforts including requirements addressing electronic protection and emerging threats will take place in the program's associated modification-in-service line, program element (PE) 0607148A.		5.769	0.959	-
<b>Title:</b> Test support  <b>Description:</b> Funding supports associated program test costs.  <b>FY 2021 Plans:</b> Conduct engineering testing and an independently evaluated, limited operational test in support of extended range efforts, Army interoperability certification (AIC) testing, a cooperative vulnerability and penetration assessment (CVPA), and electronic protection testing. Funds include associated PMO and test support costs. The Enhanced AN/TPQ-36 program will execute the funds.  <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> FY 2022 has no funds planned for execution.		2.610	3.139	-
<b>Title:</b> Program Management Support  <b>Description:</b> Funding supports associated Program Management Office (PMO) requirements.  <b>FY 2021 Plans:</b>		1.318	0.422	-



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L88 / <i>Enhanced AN/TPQ 36</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
PMO funding to support ongoing extend range and emerging threats development efforts.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> FY 2022 has no planned funds for execution.			
<b>Accomplishments/Planned Programs Subtotals</b>	11.872	13.099	-

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</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>
• B05310: <i>AN/TPQ-53 Counterfire Target Acquisition Radar</i>	16.416	71.404	-	-	-	-	-	-	-	-	-
• BA5315: <i>AN/TPQ-53 MOD-IN-SERVICE LINE</i>	-	-	31.694	-	31.694	-	-	-	-	-	-
• 0607148A: <i>AN/TPQ-53 Counterfire Target Acquisition Radar System</i>	-	-	56.681	-	56.681	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

The AN/TPQ-53 leverages technology developed in the multi-mission radar advanced technology objective (ATO) program. The system replaces all of the AN/TPQ-36 and AN/TPQ-37 systems in the fleet. The program obtained a Full Rate Production (FRP) decision in December 2015 and awarded an FRP contract in March 2017. The program will retrofit all initial production systems to the FRP configuration. The Army Acquisition Objective (AAO) increased from 174 to 189 systems in May 2017. Following the approval of a new acquisition category (ACAT) IC acquisition program baseline (APB) in April 2019, the program procured the last 15 FRP systems on contract in the same month. The Army approved a Total Army Analysis (TAA) force structure change in FY 2020.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L88 / <i>Enhanced AN/TPQ 36</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 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			
Program Management (Government)	Various	Various : Various	2.550	0.709	Dec 2019	0.422	Jan 2021	-		-		-	0.000	3.681	-
Program Management (Contractor)	Various	Various : APG, MD	4.470	0.344	Mar 2020	-		-		-		-	0.000	4.814	-
<b>Subtotal</b>			7.020	1.053		0.422		-		-		-	0.000	8.495	N/A

<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			
Electronic Protection and Emerging Threats	SS/FPIF	Lockheed Martin : Syracuse, NY	6.897	2.175	Jan 2020	8.579	Oct 2020	-		-		-	0.000	17.651	-
Extended Range	SS/FPIF	Lockheed Martin : Syracuse, NY	7.854	5.769	Nov 2019	0.959	Dec 2020	-		-		-	0.000	14.582	-
<b>Subtotal</b>			14.751	7.944		9.538		-		-		-	0.000	32.233	N/A

<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			
Program Support	SS/CPFF	Georgia Tech Research Institute (GTRI) : Atlanta, GA	1.661	0.265	Jan 2020	-		-		-		-	0.000	1.926	-
<b>Subtotal</b>			1.661	0.265		-		-		-		-	0.000	1.926	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			
Test Support	Various	Various : Activities	54.202	2.610	Dec 2019	3.139	Oct 2020	-		-		-	0.000	59.951	-
<b>Subtotal</b>			54.202	2.610		3.139		-		-		-	0.000	59.951	N/A



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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L88 / <i>Enhanced AN/TPQ 36</i>
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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
Extended Range (ER)																												
ER Testing																												
ER Limited Operational Test																												
EP and Emerging Threats - Fiscal Year (FY) 2019 VOLT																												
Modernization Testing - FY 2019 VOLT																												
EP, Emerging Threats, and Modernization Testing - FY 2021 VOLT																												

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604823A / <i>Firefinder</i>	<b>Project (Number/Name)</b> L88 / <i>Enhanced AN/TPQ 36</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Extended Range (ER)	4	2018	4	2021
ER Testing	4	2019	2	2022
ER Limited Operational Test	3	2021	3	2021
Ongoing Tests - Electronic Protection (EP) and Emerging Threats	1	2016	2	2019
EP and Emerging Threats - Fiscal Year (FY) 2019 VOLT	2	2019	1	2021
Modernization Testing - FY 2019 VOLT	2	2020	1	2022
EP, Emerging Threats, and Modernization Testing - FY 2021 VOLT	2	2021	4	2022

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</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	-	4.606	6.296	6.454	-	6.454	-	-	-	-	-	-
EY2: <i>Integrated Soldier Power Data System - Core</i>	-	1.142	3.911	4.322	-	4.322	-	-	-	-	-	-
EY4: <i>Universal Battery Charger</i>	-	1.137	0.963	0.987	-	0.987	-	-	-	-	-	-
FK4: <i>Soldier Borne Sensor (SBS)</i>	-	1.201	1.422	1.145	-	1.145	-	-	-	-	-	-
S65: <i>Platoon Power Generator</i>	-	1.126	-	-	-	-	-	-	-	-	-	-

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

This program element contains four active projects:

Project EY2 - Integrated Soldier Power Data System - Core: Supports development of the Integrated Soldier Power and Data Hub, Conformal Wearable Battery (CWB), and Squad Power Manager (SPM). These capabilities fill the power and energy requirements for critical Integrated Tactical Network Soldier worn systems to include tactical leader radios, Nett Warrior, and the Integrated Visual Augmentation System (IVAS). These capabilities are critical enablers in closing the power and energy gaps created by the increase in mission essential, Soldier portable power consumers, GPS systems, weapon sensors, radios, and other devices.

Project EY4 - Universal Battery Charger (UBC): Supports development of the UBC and UBC-L chargers. These capabilities fill the power and energy requirements for critical Integrated Tactical Network Soldier worn systems to include tactical leader radios, Nett Warrior, and the Integrated Visual Augmentation System (IVAS). These capabilities are critical enablers in closing the power and energy gaps created by the increase in mission essential, Soldier portable power consumers, GPS systems, weapon sensors, radios, and other devices by providing a family of charging solutions capable of providing power to handheld communication devices and military issued batteries.

Project FK4 - Soldier Borne Sensor (SBS): The SBS is a small unmanned aerial vehicle. The SBS provides a near term solution to three Army War-fighting Challenges at the Infantry Squad level: develop situational understanding, conduct air-ground reconnaissance, and conduct joint combined arms maneuver. The system is simple to deploy and use to support the squad leader's decision-making process. The system allows Soldiers to obtain local situational awareness and understanding of their immediate surroundings while remaining in covered or concealed positions. The SBS will be procured in multiple Tranches/increments. RDTE funding will be used to develop, integrate, and qualify additional capabilities for each tranche. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy. This SBS project is not a new start: funding from this project transferred from PE: 06005053A / Grounds Robotics project 655053.FB8.

S65 - Soldier Power: Soldier Power enables dismounted Soldiers to efficiently execute missions for longer durations by reducing the logistical burden associated with fuel and primary (disposable) batteries. Platoon Power Generation (PPG) - PM E2S2: This project supports the demonstration and development of a PPG. The Small Unit Power (SUP) PPG (1kW Generator) will provide small units with sufficient portable power to sustain Modified Table of Organizational Equipment (MTOE)

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>
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unit power demand in support of 48 to 72 hour missions using a common logistical fuel (JP-8). It will be used for charging batteries and powering various types of Army communications and electronics devices.

<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	4.803	6.534	7.611	-	7.611
Current President's Budget	4.606	6.296	6.454	-	6.454
Total Adjustments	-0.197	-0.238	-1.157	-	-1.157
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.197	-0.238			
• Adjustments to Budget Years	-	-	-1.157	-	-1.157

**Change Summary Explanation**

The total decrease of \$1.139 million, is cumulated across the associated projects. The decrease resulted from a reduction in inventory, and scaled back fuel requirement for the FK4 project. The decrease also, resulted from an across the board Army's decision to decrements project EY2, EY4, and FK4. Funding was reprioritized to support higher priority.

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>				<b>Project (Number/Name)</b> EY2 / <i>Integrated Soldier Power Data System - Core</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>
EY2: <i>Integrated Soldier Power Data System - Core</i>	-	1.142	3.911	4.322	-	4.322	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

ISPDS-C includes power and data managing/distribution devices, cutting-edge energy storage solutions, and power scavenging devices. These capabilities fill the power and energy gaps created by the increase in mission essential, Soldier portable power consumers, such as heads up displays, situational awareness displays, GPS systems, weapon sensors, radios, and other devices. This RDT&E line develops power sources and power management solutions for the individual Soldier and squad for use in all operating environments. ISPDS-C systems will enable dismounted Soldiers to execute their missions more efficiently, for longer durations and with fewer battery resupplies while reducing the logistical and physical burden associated with moving fuel and batteries, and allow dismounted Soldiers to operate independently for longer missions.

Justification: FY22 RDT&E develops and evaluates capabilities to fill the power and energy requirements for critical Integrated Tactical Network Soldier worn systems to include tactical leader radios, assured position navigation and timing, Next Generation Squad Weapon, Nett Warrior, and the Integrated Visual Augmentation System (IVAS).

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Test and Evaluation	-	0.651	1.020
<b>Description:</b> Test and validate power solutions from new battery chemistries, fuel cells, and scavenging devices and integrating the solutions using common interfaces with the Power and Data Hub and Squad Power Manager.			
<b>FY 2021 Plans:</b> Develop and integrate power distribution technology, characterize Soldier peripherals, improve current battery chemistries, test and validate new battery chemistries, and evaluate ISW solutions.			
<b>FY 2022 Plans:</b> Continue to develop and integrate power distribution technology, characterize Soldier peripherals, improve current power source chemistries, and improve protective materials and integrate into functional battery packs and pouches.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight increase due to higher volume of testing.			
<b>Title:</b> System Engineering & Program Management	-	1.176	1.176



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY2 / <i>Integrated Soldier Power Data System - Core</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> Conduct system engineering and project management for ISDPS-C efforts and power characterization efforts.</p> <p><b>FY 2021 Plans:</b> Conduct system engineering and project management for ISDPS-C efforts and power characterization studies.</p> <p><b>FY 2022 Plans:</b> Continue to conduct system engineering, project management, and additional R&amp;D center power characterization studies for ISDPS-C efforts.</p>			
<p><b>Title:</b> ISDPS-C/CWB Capability Improvements Integration</p> <p><b>Description:</b> Evaluate higher energy density power solutions.</p> <p><b>FY 2021 Plans:</b> Conduct integration of power distribution technologies and fuel cells capable of supporting the variety of power devices used in tactical formations and Integrate emerging alternative fuel cell technologies such as SI-Anode batteries.</p> <p><b>FY 2022 Plans:</b> Integrate emerging alternative power technologies and higher density batteries cells such as SI-Anode.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight increase due to transition to higher capacity fuel cell.</p>	1.142	1.212	1.236
<p><b>Title:</b> Develop alternative CWB sources.</p> <p><b>Description:</b> Develop alternative CWB sources.</p> <p><b>FY 2021 Plans:</b> Test and evaluate alternative battery technologies.</p> <p><b>FY 2022 Plans:</b> Continue to test and evaluate incremental improvement in CWB packaging battery technologies to increase overall conformal battery power capacity.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase to evaluate some incremental increase in CWB power capacity.</p>	-	0.872	0.890
<b>Accomplishments/Planned Programs Subtotals</b>	1.142	3.911	4.322

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY2 / <i>Integrated Soldier Power Data System - Core</i>

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2022</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• R08090: <i>Integrated Soldier Power Data System - Core</i>	20.379	17.818	5.947	-	5.947	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Pursue a variety of Soldier power products under full and open competition. Initiatives range from Commercial-Off-The-Shelf (COTS) solutions to developmental efforts. The type of solicitation depends on the maturity of the technology. The power initiatives will be evaluated through scheduled test and evaluation events, and if successful, selected for procurement and subsequent fielding and sustainment. The acquisition strategy varies by product. For example, the CWB acquisition strategy consists of two phases: Phase one includes the purchase of test articles using the Defense Logistics Agency (DLA) Special Operational (Spec Ops) Equipment Tailored Logistic Support Program (TLSP) and General Services Administration (GSA) contracts. Phase two establishes an Indefinite Delivery Indefinite Quantity (IDIQ) contract through the Army Contracting Command (ACC) which qualifies a minimum of two vendors to take into production. The Project Manager office will establish IDIQ contracts to support the ISPDS-C requirements over time. Each ISPDS-C system will be procured under purchase orders for production quantities that will be awarded on a Firm Fixed Price (FFP) contract.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604827A / Soldier Systems - Warrior Dem/Val				EY2 / Integrated Soldier Power Data System - Core							
Management Services (\$ in Millions)				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
System Engineering & Program Management Support	MIPR	Various : Various	2.675	-		1.176		1.176		-		1.176	Continuing	Continuing	-
<b>Subtotal</b>			2.675	-		1.176		1.176		-		1.176	Continuing	Continuing	N/A
Product Development (\$ in Millions)				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
ISPDS-C, CWB Capability Improvements Integration	MIPR	Various : Various	4.954	1.142		1.212		1.236		-		1.236	Continuing	Continuing	-
Squad Power Manager ECP	MIPR	Various : Various	1.986	-		-		-		-		-	Continuing	Continuing	-
Develop alternative CWB sources	MIPR	Various : Various	-	-		0.872		0.890		-		0.890	Continuing	Continuing	-
<b>Subtotal</b>			6.940	1.142		2.084		2.126		-		2.126	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
Test and Evaluation	MIPR	Various : Various	1.716	-		0.651		1.020		-		1.020	Continuing	Continuing	-
<b>Subtotal</b>			1.716	-		0.651		1.020		-		1.020	Continuing	Continuing	N/A
<b>Project Cost Totals</b>			11.331	1.142		3.911		4.322		-		4.322	Continuing	Continuing	N/A
<b>Remarks</b>															

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY2 / <i>Integrated Soldier Power Data System - Core</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
Testing of Product Improvements	[Redacted]																											
Develop, Test and evaluate and upgrade CWB	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Evaluate 3.6.2 CWB packaging modifications	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Evaluate Next Gen CWB Technology	[Redacted]																											
Alternate power source development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Enhanced CWB Contract Award 3Q21 - 4Q21	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Next Gen Power and Data Hub award	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Increased Capacity Alternate Power Source	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Cable and connector Interface Product improvements	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Charging on the move development, test integration 3Q21 - 4Q23	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Higher Energy CWB testing 4Q21 - 4Q23	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Market Research/Lab Assessments of Alternate power source & batteries 3Q21-4Q21	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Market Research/Lab Assessments of Alternate power source & batteries 3Q21-4Q21	[Redacted]				[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:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY2 / <i>Integrated Soldier Power Data System - Core</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
Market Research/Lab Assessments of Alternate power source & batteries 3Q22-4Q22																												
Market Research/Lab Assessments of Alternate power source & batteries 3Q23-4Q23																												
Market Research/Lab Assessments of Alternate power source & batteries 3Q24-4Q24																												
Market Research/Lab Assessments of Alternate power source & batteries 3Q25-4Q25																												
Market Research/Lab Assessments of Alternate power source & batteries 3Q26-4Q26																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Army		Date: May 2021
<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY2 / <i>Integrated Soldier Power Data System - Core</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Testing of Product Improvements	1	2020	4	2026
Develop, Test and evaluate and upgrade CWB	2	2020	4	2022
Evaluate 3.6.2 CWB packaging modifications	1	2021	2	2021
Evaluate Next Gen CWB Technology	1	2021	4	2026
Alternate power source development	2	2021	4	2022
Enhanced CWB Contract Award 3Q21 - 4Q21	3	2021	4	2021
Next Gen Power and Data Hub award	2	2021	3	2021
Increased Capacity Alternate Power Source	4	2022	4	2026
Cable and connector Interface Product improvements	2	2021	4	2023
Charging on the move development, test integration 3Q21 - 4Q23	3	2021	4	2023
Higher Energy CWB testing 4Q21 - 4Q23	4	2021	4	2023
Market Research/Lab Assessments of Alternate power source & batteries 3Q20-4Q20	3	2020	4	2020
Market Research/Lab Assessments of Alternate power source & batteries 3Q21-4Q21	3	2021	4	2021
Market Research/Lab Assessments of Alternate power source & batteries 3Q22-4Q22	3	2022	4	2022
Market Research/Lab Assessments of Alternate power source & batteries 3Q23-4Q23	3	2023	4	2023
Market Research/Lab Assessments of Alternate power source & batteries 3Q24-4Q24	3	2024	4	2024
Market Research/Lab Assessments of Alternate power source & batteries 3Q25-4Q25	3	2025	4	2025
Market Research/Lab Assessments of Alternate power source & batteries 3Q26-4Q26	3	2026	4	2026

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY4 / <i>Universal Battery Charger</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
EY4: <i>Universal Battery Charger</i>	-	1.137	0.963	0.987	-	0.987	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

Universal Battery Charger: Universal Battery Charger (UBC) fills the power and energy gap created by the increase in mission essential, Soldier portable power consumers, by providing a family of charging solutions capable of providing power to handheld communication devices and military batteries to support mounted and dismounted formations. The UBC is suited for mounted and dismounted operations at the company level and below in multi-domain and austere operating environments. The system can draw power from wall outlets, vehicle power, generators, and solar power sources. The UBC enables dismounted Soldiers to execute their missions with fewer battery resupplies, thus reducing the logistical burden associated with moving fuel and batteries. The UBC capability allows dismounted Soldiers to operate independently for longer missions. The UBC fills the power and energy gap associated with bulk charging. This project also develops and integrates vehicular on-the-move charging and scavenging systems.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Test &amp; Evaluation</p> <p><b>FY 2021 Plans:</b> Evaluation and improvement of Family of UBCs by decreasing weight and increasing battery recharging performance. Test and evaluation efforts also consider bulk charging initiatives. Develop and integrate vehicular on-the-move charging systems.</p> <p><b>FY 2022 Plans:</b> Continue to evaluate improvements to charger performance and bulk charging capabilities. Continue to develop and integrate vehicular on-the-move charging systems and reduce SWAP-C of the UBC product line.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Slight increase due to higher volume of testing.</p>	0.756	0.576	0.592
<p><b>Title:</b> System Engineering &amp; Program Management</p> <p><b>FY 2021 Plans:</b> Conduct design and development of improved UBC and bulk charging capabilities.</p> <p><b>FY 2022 Plans:</b> Update technical drawings and provisioning data to establish NSNs, tech manual changes and safety release documentation for improved Family UBC and bulk charging.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>	0.381	0.387	0.395

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY4 / <i>Universal Battery Charger</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Slight increase due to growth in integration activities.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.137	0.963	0.987

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2022</b>	<b>FY 2022</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>
• R09103: <i>Universal Battery Charger</i>	7.865	10.066	6.243	-	6.243	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
 Contracts will be awarded to test, evaluate, and procure the next generation family of battery chargers to meet the increased power demand on the Soldier. A full and open, five year Indefinite Delivery Indefinite Quantity (IDIQ) production contract was awarded 27 January 2016 to procure the UBC. The PM will initiate efforts to establish a new Indefinite Delivery Indefinite Quantity (IDIQ) contract with Firm Fixed Price (FFP) delivery orders through the Army Contracting Command (ACC) Aberdeen Proving Grounds. The program office may also utilize the Defense Logistics Agency - Tailored Logistics Support competitively awarded contracts to procure UBC systems in FY 2021 and beyond.





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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY4 / <i>Universal Battery Charger</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
Battery charger performance improvements																												
Test and evaluate new CWB charging cup																												
Evaluation of modernized battery chargers																												
UBC-Lite performance improvements																												
Develop and evaluate charging on-the-move capabilities																												
Battery charger performance improvements Phase 2																												
UBC vehicle integration																												
Evaluation of modernized battery chargers Phase 2																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> EY4 / <i>Universal Battery Charger</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Battery charger performance improvements	1	2020	2	2020
Test and evaluate new CWB charging cup	1	2020	3	2020
Evaluation of modernized battery chargers	1	2020	4	2021
UBC-Lite performance improvements	1	2021	3	2023
Develop and evaluate charging on-the-move capabilities	1	2021	4	2026
Battery charger performance improvements Phase 2	1	2022	4	2026
UBC vehicle integration	2	2022	4	2023
Evaluation of modernized battery chargers Phase 2	3	2022	4	2026

**Note**

Beginning in FY 2018, funding for Universal Battery Charger was realigned from Program Element: 0604827A (Soldier Systems - Warrior Dem/Val)/Project S65/Soldier Power. Prior to this realignment Soldier and Small Unit Power initiated developmental and test power solutions for the UBC technologies.

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

<b>Appropriation/Budget Activity</b> 2040 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>				<b>Project (Number/Name)</b> FK4 / <i>Soldier Borne Sensor (SBS)</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>
FK4: <i>Soldier Borne Sensor (SBS)</i>	-	1.201	1.422	1.145	-	1.145	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

Project FK4 - Soldier Borne Sensor (SBS): The SBS is a small unmanned aerial vehicle. The SBS provides a near term solution to three Army War-fighting Challenges at the Infantry Squad level: develop situational understanding, conduct air-ground reconnaissance, and conduct joint combined arms maneuver. The system is simple to deploy and use to support the squad leader's decision-making process. The system allows Soldiers to obtain local situational awareness and understanding of their immediate surroundings while remaining in covered or concealed positions. The SBS Phase 1 will be procured through multiple phases. We will use the funding in this project to develop, integrate, and qualify additional capabilities for each phase. Funding in this project aligns with the Army's priorities in support of the National Defense Strategy.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Soldier Borne Sensor (SBS)	1.201	1.422	1.145
<b>Description:</b> The SBS provides the squad a "quick look" capability providing Situational Awareness (SA).			
<b>FY 2021 Plans:</b> The program will complete OTA prototype project(s) to rapidly incorporate new technologies including improved thermal cameras, improved obstacle avoidance, and integration with the Adaptive Squad Architecture into prototypes for evaluation. Additionally, the program plans to integrate SBS with systems such as Tactical Assault Kit (TAK)/Nett Warrior, Enhanced Night Vision Goggle (ENVG) and Heads Up Display (HUD) Integrated Visual Augmentation System (IVAS).			
<b>FY 2022 Plans:</b> This program will continue Phase 2 prototyping and rapidly incorporate new technologies matured during the Phase 2 technology development phase to include improved thermal cameras, improved obstacle avoidance, and integration with the Adaptive Squad Architecture. These prototypes will undergo testing and evaluation from 3QFY21 to 1QFY22. Additionally, the program plans to integrate SBS with systems such as Tactical Assault Kit (TAK)/Nett Warrior, Enhanced Night Vision Goggle (ENVG) and Integrated Visual Augmentation System (IVAS).			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease in funding from FY 2021 to FY 2022 as the integration of advanced technology matured with testing of Phase 2 prototypes.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.201	1.422	1.145

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> FK4 / <i>Soldier Borne Sensor (SBS)</i>

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• W63798: <i>Soldier Borne Sensor (SBS)</i>	23.362	18.907	18.654	-	18.654	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

SBS initiated an OTA prototype project in 3QFY 2020. The prototype system will be evaluated to determine whether it is a sufficient improvement to procure as a Phase 2 SBS system. The evaluation is planned for 3QFY21 to 1QFY22.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 5				PE 0604827A / Soldier Systems - Warrior Dem/Val					FK4 / Soldier Borne Sensor (SBS)						
Management Services (\$ in Millions)				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
Program Management Admin (PMA)	MIPR	ASC : Ft Belvoir	-	0.058	Nov 2019	0.060	Nov 2020	0.062	Nov 2021	-		0.062	Continuing	Continuing	-
<b>Subtotal</b>			-	0.058		0.060		0.062		-		0.062	Continuing	Continuing	N/A
Product Development (\$ in Millions)				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
Phase 2 Prototype	C/FFP	Vantage Robotics : San Leandro, CA 95577	-	0.810	Feb 2020	1.138	Feb 2021	0.143	Oct 2021	-		0.143	Continuing	Continuing	2.534
<b>Subtotal</b>			-	0.810		1.138		0.143		-		0.143	Continuing	Continuing	N/A
Support (\$ in Millions)				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
Matrix Support	Various	Various : Multiple	-	0.333	Jan 2020	0.075	Nov 2020	0.077	Nov 2021	-		0.077	Continuing	Continuing	-
<b>Subtotal</b>			-	0.333		0.075		0.077		-		0.077	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				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
Phase 2- Technology Integration and Testing	TBD	Various : Various	-	-		0.149	Apr 2021	0.863	Dec 2021	-		0.863	Continuing	Continuing	-
<b>Subtotal</b>			-	-		0.149		0.863		-		0.863	Continuing	Continuing	N/A



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> FK4 / <i>Soldier Borne Sensor (SBS)</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
Phase 1 - First Unit Equiped (FUE)				▲ 1 Phase 1 - FUE																								
Phase 2 - Technology Development																												
Phase 2 - System Technology Improvements and Integration																												
Phase 2 - Prototype Technology Integration and Testing																												



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> FK4 / <i>Soldier Borne Sensor (SBS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Phase 1 - First Unit Equiped (FUE)	4	2020	4	2020
Phase 2 - Technology Development	4	2018	4	2020
Phase 2 - System Technology Improvements and Integration	3	2020	4	2026
Phase 2 - Prototype Technology Integration and Testing	4	2020	3	2022

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> S65 / <i>Platoon Power Generator</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
<i>S65: Platoon Power Generator</i>	-	1.126	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

Mobile Soldier Power enables dismounted Soldiers to efficiently execute missions for longer durations by reducing the logistical burden associated with fuel and primary (disposable) batteries. Power solutions address energy deficits resulting from increased power demands associated with providing the Soldier with increased situational awareness displays, Global Positioning System (GPS) systems, weapon sensors, radios, and other devices. The Soldier and Small Unit Power system develops and tests power sources and solutions suited for the individual Soldier, team, squad, and platoon in the most austere operating environments. Develops and evaluates additional sources of power such as individual Soldier worn systems, renewable energy, and kinetic energy harvesting technologies. This effort is consistent with the Sep 2013 Small Unit Power CDD, the Dec 2011 Operational Energy ICD, and the Mar 2011 Soldier Protection CDD, and the Universal Battery Charger CPD (May 2015).

Platoon Power Generation - PM E2S2: This project supports the demonstration and development of a Platoon Power Generation (PPG). PPG will provide small units with no less than 900 Watts of portable power to sustain Modified Table of Organizational Equipment (MTOE) unit power demand in support of 48 to 72 hour missions using a common logistical fuel (JP-8). It will be used for charging batteries and powering various types of Army communications and electronics devices. It will provide sufficient power to recharge and power all Platoon equipment and fulfill residual power gaps at the Squad and Soldier level. The generator will provide Platoon power for charging batteries when away from vehicles in all Brigade Combat Teams (Stryker, Armor and Infantry), Rangers and Special Forces in austere environments. FY 2020 funds will be used to complete the Engineering and Manufacturing Development (EMD) Phase.

Funding supports modernization of the current power generation for Soldier borne sensors by investigating technology insertions including, but not limited to a modified COTS generator concept and proprietary fuel atomization. Funding also supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational energy concepts.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Platoon Power Generation (PPG) - PM E2S2	1.126	-	-
<b>Description:</b> Manage an EMD phase R&D contract for the PPG.			
<b>Accomplishments/Planned Programs Subtotals</b>	1.126	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> S65 / <i>Platoon Power Generator</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• R08090: <i>Integrated Soldier Power Data System - Core</i>	20.379	17.818	5.947	-	5.947	-	-	-	-	-	-
• R09103: <i>Universal Battery Charger</i>	7.865	10.066	6.243	-	6.243	-	-	-	-	-	-
• EY2: <i>Integrated Soldier Power Data System - Core</i>	1.142	3.911	4.322	-	4.322	-	-	-	-	-	-
• EY4: <i>Universal Battery Charger</i>	1.137	0.963	0.987	-	0.987	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

PEO CS/CSS Effort on the Platoon Power Generation - PM E2S2:

Utilizing Other Transactional Agreement (OTA) contract vehicle culminating in an EMD award of three (3) Firm Fixed Price (FFP) contracts supporting an 18-24 month Engineering and Manufacturing Development (EMD) phase. Three selected contractors have been awarded EMD contracts and will separately fabricate and produce the minimum order of 13 Small Unit Power Platoon Power Generation (>900 Watts) systems. After completing a successful down select, two contractors have been selected to undergo developmental test (DT), logistics development, and early operational assessment (EOA). Upon successful completion of these tests and completion of logistics supportability, the performance data and Soldier's feedback will be utilized in preparation for Milestone C (MS C).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604827A / Soldier Systems - Warrior Dem/Val				S65 / Platoon Power Generator								
<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	
Platoon Power Generation	Various	PM E2S2 : Fort Belvoir, VA	0.467	0.297		-		-		-		-	0.000	0.764	-	
<b>Subtotal</b>			0.467	0.297		-		-		-		-	0.000	0.764	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	
Platoon Power Generation	C/FFP	Picatinny : Contractor Sites	9.358	-		-		-		-		-	1.500	10.858	-	
<b>Subtotal</b>			9.358	-		-		-		-		-	1.500	10.858	N/A	
<b>Support (\$ 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	
Platoon Power Generation	MIPR	APG : APG	3.419	-		-		-		-		-	0.600	4.019	-	
<b>Subtotal</b>			3.419	-		-		-		-		-	0.600	4.019	N/A	
<b>Test and Evaluation (\$ 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	
Platoon Power Generation	MIPR	Ft. Benning : Ft. Benning	0.511	0.829		-		-		-		-	0.220	1.560	-	
<b>Subtotal</b>			0.511	0.829		-		-		-		-	0.220	1.560	N/A	
<b>Project Cost Totals</b>			13.755	1.126		0.000		-		-		-	2.320	17.201	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2022 Army							<b>Date:</b> May 2021			
<b>Appropriation/Budget Activity</b> 2040 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>			<b>Project (Number/Name)</b> S65 / <i>Platoon Power Generator</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

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> S65 / <i>Platoon Power Generator</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
EMD Contract (PPG)																												
Developmental Testing (PPG)																												
EOA (PPG)	1 EOA (PPG)																											
Milestone C Restructure (PPG)					2 Milestone C Restructure (PPG)																							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604827A / <i>Soldier Systems - Warrior Dem/Val</i>	<b>Project (Number/Name)</b> S65 / <i>Platoon Power Generator</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone B (PPG)	1	2019	1	2019
EMD Contract Award (PPG)	2	2019	2	2019
EMD Contract (PPG)	2	2019	3	2021
Critical Design Review (CDR) (PPG)	2	2019	2	2019
Developmental Testing (PPG)	2	2020	2	2021
EOA (PPG)	2	2020	2	2020
Milestone C Restructure (PPG)	3	2021	3	2021

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / <i>Suite of Survivability Enhancement Systems - EMD</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	-	81.899	62.012	106.354	-	106.354	-	-	-	-	-	-
FE8: <i>Vehicle Protection Suite</i>	-	45.941	62.012	106.354	-	106.354	-	-	-	-	-	-
XU9: <i>Active Protection System</i>	-	35.958	-	-	-	-	-	-	-	-	-	-

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

Note: Soft Kill Acquisition Program under "Survivability Improvements" is a new start program in FY2022.

Current ground combat vehicle platforms and tactical wheeled vehicles within Army Brigade Combat Teams (BCTs) lack the ability to effectively detect, track, divert, disrupt, neutralize, or destroy incoming direct or indirect fired threat munitions. Current solutions to defeat these threats, Explosive Reactive Armor (ERA) and Slat armor, do not provide preemptive or active protection and impose secondary blast hazards to crew, dismounted soldiers, and adjacent vehicles and equipment. The Suite of Vehicle Protection Systems - EMD PE 0604852A will develop and mature solutions to increase the protection of the Army's ground systems from both current and next generation direct or indirect fired threat munitions.

The Active Protection System will install and characterize Non-Developmental Item (NDI) Active Protection Systems on Abrams, Bradley, and Stryker demonstrator vehicles. The Active Protection System effort will assess the maturity, performance, and integration risk of NDI Active Protection Systems, develop and refine Abrams, Bradley, and Stryker Active Protection System installation kit designs, and build prototypes necessary to conduct performance and safety testing to obtain an Active Protection System Urgent Materiel Release (UMR). Active Protection System effort will execute installation design refinement and required testing to meet urgent fielding of NDI APS on Abrams, Bradley and Stryker pending Army leadership approval. The Active Protection System NDI effort served to inform the Vehicle Protection Suite Trade Study.

The Vehicle Protection Suite (VPS) Project (FE8) will design, mature, and evaluate combinations of active, reactive, and passive solutions and leverage both Horizontal Technology Integration (HTI) principles and the Army's Modular Active protection system Controller (MAC) to develop tailored vehicle Survivability Sets that will mitigate existing protection gaps, allow for future technology insertion to meet evolving threats, and minimize the impact to the current capabilities hosted on Army ground system platforms.



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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / <i>Suite of Survivability Enhancement Systems - EMD</i>
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<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	85.198	82.459	99.934	-	99.934
Current President's Budget	81.899	62.012	106.354	-	106.354
Total Adjustments	-3.299	-20.447	6.420	-	6.420
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-33.437			
• Congressional Rescissions	-	-			
• Congressional Adds	-	16.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.299	-3.010			
• Adjustments to Budget Years	-	-	6.420	-	6.420

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** FE8: *Vehicle Protection Suite*

Congressional Add: *Radar Sensor Technology*

Congressional Add: *Bradley Family of Vehicles (BFV) Active Protection System*

	<b>FY 2020</b>	<b>FY 2021</b>
	5.000	-
	-	16.000
Congressional Add Subtotals for Project: FE8	5.000	16.000
Congressional Add Totals for all Projects	5.000	16.000

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite
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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
FE8: <i>Vehicle Protection Suite</i>	-	45.941	62.012	106.354	-	106.354	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

Current ground combat vehicle platforms and tactical wheeled vehicles within Army Brigade Combat Teams (BCTs) lack the ability to effectively detect, track, divert, disrupt, neutralize, or destroy incoming direct or indirect fired threat munitions. Current solutions to defeat these threats, Explosive Reactive Armor (ERA) and Slat armor, do not provide preemptive or active protection and impose secondary blast hazards to crew, dismounted soldiers, and adjacent vehicles and equipment.

Vehicle Protection Suite (VPS) will design, mature, integrate, evaluate, and field combinations of active, reactive, and passive solutions and leverage both Horizontal Technology Integration (HTI) principles and the Army's Modular Active Protection System Controller (MAC) to develop configurable vehicle Survivability Sets that will mitigate existing protection gaps, allow for future technology insertion to meet evolving threats, and minimize the impact to the current capabilities hosted on Army ground combat and tactical vehicle platforms.

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

	FY 2020	FY 2021	FY 2022
<p><b>Title:</b> Modular Active protection system Controller (MAC) Framework Integration of Non-Developmental Items (NDI) and Developmental Technologies</p> <p><b>Description:</b> Modular Active Protection System Controller (MAC) with Laser Warning Receiver (LWR) effort to incorporate on to the ground combat vehicle platforms the LWR through the Vehicle Protection System (VPS) Base Kit based on the Modular APS Framework (MAF). The maturation and integration effort will include qualification testing, integration design development, prototype build, and platform testing and logistics products.</p> <p><b>FY 2021 Plans:</b> Continue LWR with the MAC integration design efforts, to include design development, prototype build, component and platform qualification testing and logistics products onto the Abrams, Bradley, AMPV, Stryker, and other identified ground combat vehicle platforms.</p> <p><b>FY 2022 Plans:</b> Continue LWR with the MAC integration design efforts, to include integration design development, platform prototype build, vehicle level testing and logistics products development for the Bradley and AMPV, and begin integration efforts on Stryker variants. Start the VPS base kit product enhancements maturation efforts.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>	25.593	33.008	61.251

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
Increase is due to the Platform integration, Vehicle level testing and logistic product development of multiple combat platforms in FY2022. The increase is also due to the transition of the Soft Kill acquisition program from S&T to PdM VPS office to initiate the continued maturation and qualification testing of Soft Kill capabilities.				
<b>Title:</b> Survivability Improvements		10.834	7.098	33.922
<b>Description:</b> Funding for the continued maturation of Science and Technology (S&T) funded protection technologies, continued maturation, design development of the platform integration, test, logistic product development, and fielding of active, reactive, and passive survivability improvements onto ground combat vehicle platforms.				
<b>FY 2021 Plans:</b> Continue qualification testing and logistic product development of passive and reactive armor tiles and top protection on ground combat vehicle platforms. Continue Signature Management vehicle integration and vehicle Camouflage, Concealment, Deception, and Obscuration (CCDO) engineering development, testing, and transportation onto ground combat vehicles. Continuation of Tranche II technology integration and testing onto ground combat platforms identified via the VPS trade study or as they emerge from industry or government S&T efforts. Continued trade studies and engineering assessments of technology integration on existing and emerging ground vehicles. Technologies include but are not limited to: counter improvised explosive devices technologies, soft kill and hard kill active protection system technologies, top attack defense, radar system upgrades, signature management, vehicle Camouflage, Concealment, Deception, and Obscuration (CCDO), and other emerging vehicle protection technologies.				
<b>FY 2022 Plans:</b> Will continue qualification testing and logistic product development of passive and reactive armor tiles on ground combat vehicle platforms. Continue Signature Management vehicle integration; top attack, and vehicle Camouflage, Concealment, Deception, and Obscuration (CCDO) engineering development, testing, and transportation onto ground combat vehicles. Continuation of Tranche II technology integration and testing onto ground combat platforms identified via the VPS trade study or as they emerge from industry or government S&T efforts. Procure threats to support the continued maturation and testing of VPS technologies. Initiation of the Soft Kill acquisition program for system development, platform integration planning and OT&E on ground combat platforms. Continued engineering studies, improvement assessments, testing, and characterization/demonstrations of Active Protection systems (hard kill, soft kill, and threat detection), top attack protection, radar system upgrades, CCDO, and other emerging vehicle protection technologies for integration onto ground combat platforms. Maturation efforts continue for feasibility of passive and reactive armor solutions for PEO GCS combat platforms. Planned activities include engineering development, testing, platform integration and transportation onto ground combat vehicles.				
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>				

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p>Increase due to the transition of the Soft Kill acquisition program from S&amp;T to PdM VPS office to initiate the continued maturation and qualification testing of Soft Kill capabilities. Continued maturation of passive protection capabilities, improvement, Assessments, and testing of existing active, passive, and reactive protection systems for integration on ground combat platforms.</p> <p><b>Title:</b> Vehicle Protection Suite Government Engineering and Program Management</p> <p><b>Description:</b> Government program management support and program oversight.</p> <p><b>FY 2021 Plans:</b> Continuing government program management support to provide VPS program planning, to include the oversight of: MAC characterization and development of MAC-compliant, active, reactive, and passive VPS survivability set protection solutions and continuation of Survivability Improvement projects.</p> <p><b>FY 2022 Plans:</b> Will continue government program management support to provide VPS program planning, to include the oversight of: MAC Characterization and development of MAC compliant, active, reactive and passive VPS survivability set protection solutions, Active Protection System development, CCDO program development and continuation of Survivability Improvement projects.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Increase due to the initiation of the Soft Kill, acquisition program active, reactive, and passive VPS survivability set protection solutions, Camouflage, Concealment, Deception, and Obscuration (CCDO) program development and continuation of Survivability Improvement projects.</p>		4.514	5.906	8.231
<p><b>Title:</b> VPS Trade Study</p> <p><b>Description:</b> VPS will execute a trade study/feasibility assessment to identify capabilities for active, reactive and passive protection solutions, to pursue in the next phase of the program (Tranche III). A Trade Study/feasibility assessment will provide the data deemed sufficient for the identification of capabilities to pursue in Tranche III. This Trade Study/feasibility assessment will build off previous studies to identify the benefit of adding capabilities to current set. The trade study/feasibility assessment will also look at emerging threats to identify capabilities used to protect against those threats.</p> <p><b>FY 2022 Plans:</b> VPS will identify preemptive, active, reactive, passive (or a combination thereof) vehicle defense capabilities that are mature. The trade study/feasibility assessment will look at capabilities that are able to detect, track, divert, disrupt, neutralize, and/or destroy incoming threats, non-lethal/lethal unmanned aircraft systems (UAS), air to ground missiles, Improvised Explosive Device (IEDs)/mines, as well as prevent, mitigate and recover from Electronic Warfare (EW) and Cyber threats. These capabilities will be analyzed via a Trade Study/feasibility assessment and/or characterization/demonstration to understand the benefit the capability or combination of capabilities provide. This analysis will identify capabilities to pursue in future tranches. Continued limited</p>		-	-	2.950

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
characterizations of APS solutions are planned to better understand their functionality, generate performance data, and determine suitability to be integrated onto a Stryker platform as well as other ground combat platforms.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> An increase to VPS Trade Study is due to the need to execute a VPS trade study/feasibility assessment to identify capabilities for active, reactive and passive protection solutions, to pursue in the next phase of the program (Tranche III).			
<b>Accomplishments/Planned Programs Subtotals</b>	40.941	46.012	106.354

	FY 2020	FY 2021
<b>Congressional Add:</b> Radar Sensor Technology <b>FY 2020 Accomplishments:</b> Development efforts completed to evaluate and perform limited characterizations of radar sensor technologies for vehicle protection systems application. New start, congressional add program to create an upgraded, multimode version of the Hard Kill radar system and transition to a US-manufactured source for the radar. A secure supply chain will address the Army's near-term VPS strategy and inform future capabilities. The contract award occurred September of 2020. Prototype development, integration, and testing will occur during 2021.	5.000	-
<b>Congressional Add:</b> Bradley Family of Vehicles (BFV) Active Protection System <b>FY 2021 Plans:</b> Conducting government testing of the Iron Fist-Light Decoupled (IFLD) phase 2 system on a Bradley vehicle in support of the urgent material release. Testing will begin in 3Q21 and complete 4Q22. Contractor test support will be required.	-	16.000
<b>Congressional Adds Subtotals</b>	5.000	16.000

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

N/A

**Remarks**

On 21 SEPT 2016 - Directed Requirement for Reactive Armor Tiles and Installation Kits received and on 17 NOV 2017 Army Requirements Oversight Council (AROC) approved VPS ICD as the requirements to move forward with production of reactive armor tiles for the Armored Multi-Purpose Vehicle (AMPV) in Fiscal Year (FY) 2022, \$17.755 million APPN: 2034A; BA 1; Line Item Number: 9847E97900; Title: Reactive Armor Tiles.

NOV 2020 Army Requirements Oversight Council (AROC) approved VPS Capability Development Document (CDD) and on 16 DEC 2020 AROCM 20-27 approved the CDD for protection improvements to include VPS Base Kit, Softkill, Hardkill, LWR, Signature Management and Obscuration as the requirements to procure MAPS with

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite

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

LWR for the Bradley A4 platform and procure Signature Management Paint for AMPV and Stryker In FY 2022, \$29.102 million APPN: 2033A: Procurement of W&TCV, Army; BA 1: Tracked Combat Vehicles; Line Item Number: 6652GM1900; Title: Vehicle Protection Systems (VPS).

**D. Acquisition Strategy**

VPS Trade Studies/Feasibility Assessments will assess the cost, maturity, complexity, performance, and physical properties of enhanced survivability technologies to determine the optimal application of VPS capabilities onto the Army's ground combat platforms. In FY 2018, the VPS program initiated the initial VPS Trade Study/Feasibility Assessment to confirm survivability capabilities for focus in Tranche I and II, to include integration with the Modular Active Protection System (MAC). Focus of Tranche I was with Reactive Armor Tiles, laser threat detection with a common controller and signature management reduction. Support of Tranche efforts will be achieved through bailments, Cooperative Research and Development Agreements (CRADA), and Other Transactional Agreements (OTA) with industry and government partners. The VPS Tranche II solutions (soft and hard kill integration with MAC, threat detection, Camouflage, Concealment, Deception and Obscuration (CCDO), top protection, active blast defeat, and other emerging protection technologies) based on the results of the Trade Study will have decision points and program initiations beginning in FY 2020. Along with the Tranche II activities starting in FY 2020, the VPS program will continue, maturation, qualification testing, platform integration, vehicle testing and fielding efforts (i.e. logistics and software development) with Tranche I programs. A Tranche III trade study/feasibility assessment will initiate in FY 2022 to define the next set of VPS technologies, based on evolving enemy threats, to focus on. These capabilities may include counter-unmanned aerial systems and the integration of artificial intelligence into vehicle survivability technologies.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604852A / Suite of Survivability Enhancement Systems - EMD				FE8 / Vehicle Protection Suite							
Management Services (\$ in Millions)				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
Vehicle Protection Suite Program Management	MIPR	TACOM Warren, Michigan : Various	8.387	4.514	Feb 2020	5.906	Jan 2021	8.231	Oct 2021	-		8.231	24.549	51.587	-
<b>Subtotal</b>			8.387	4.514		5.906		8.231		-		8.231	24.549	51.587	N/A
Product Development (\$ in Millions)				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
MAC Framework Integration of Non-Developmental Items (NDI) and Developmental Technologies	TBD	Various : TBD	16.222	23.494	Jun 2020	29.608	Jun 2021	52.277	Jun 2022	-		52.277	32.010	153.611	-
Survivability Improvements	MIPR	Various TACOM Warren : Warren, MI	0.650	10.306	Feb 2020	2.072	Jan 2021	32.099	Jan 2022	-		32.099	230.687	275.814	-
Radar Sensor Technology	TBD	Various TACOM Warren : Warren, MI	-	5.000	Aug 2020	-		-		-		-	0.000	5.000	-
Bradley Family of Vehicles (BFV) Active Protection System	Various	TBD : TBD	-	-		16.000	May 2021	-		-		-	0.000	16.000	-
<b>Subtotal</b>			16.872	38.800		47.680		84.376		-		84.376	262.697	450.425	N/A
Support (\$ in Millions)				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
Vehicle Protection Suite Trade Study	MIPR	Various : TACOM Warren Michigan	3.103	-		-		2.950	Mar 2022	-		2.950	0.000	6.053	-
<b>Subtotal</b>			3.103	-		-		2.950		-		2.950	0.000	6.053	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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite
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<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			
Survivability Improvements	MIPR	Various TACOM Warren : Warren, MI	1.792	0.528	Jun 2020	5.026	Jun 2021	1.823	Jun 2022	-		1.823	1.823	10.992	-
MAC Framework Integration of Non-Developmental Items (NDI) and Developmental Technologies	MIPR	Various TACOM Warren : Warren, MI	1.375	2.099	Jun 2020	3.400		8.974	Jun 2022	-		8.974	76.663	92.511	-
<b>Subtotal</b>			3.167	2.627		8.426		10.797		-		10.797	78.486	103.503	N/A

**Remarks**  
N/A

	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>	31.529	45.941	62.012	106.354	-	106.354	365.732	611.568	N/A

**Remarks**



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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite

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
VPS NDI Capability Install/Characterization	[Redacted]				[Redacted]																							
VPS MAC Development Contract Awards	[Redacted]				▲ 1	[Redacted]			[Redacted]																			
(MAC) with (LWR) - MAC and LWR (MAC) with (LWR) - Maturation	[Redacted]				[Redacted]																							
(MAC) with (LWR) - Software Development	[Redacted]				[Redacted]				[Redacted]																			
(MAC) with (LWR) - Component Qualification Testing	[Redacted]				[Redacted]																							
(MAC) with (LWR) - Integration Design (Abrams, Bradley, AMPV, Stryker)	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
(MAC) with (LWR) - Logistic Product Development	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]											
(MAC) with (LWR) - Integration Contract Awards	[Redacted]				▲ 3	[Redacted]			[Redacted]																			
(MAC) with (LWR) - Platform Testing	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
(MAC) with (LWR) - Base Kit Improvements Maturation	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]											
(MAC) with (LWR) - Integration Contract Awards	[Redacted]				[Redacted]				▲ 6	[Redacted]			[Redacted]															
(MAC) with (LWR) - Procurement Contract Award	[Redacted]				[Redacted]				▲ 7	[Redacted]			[Redacted]															
Survivability Improvements Development	[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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite

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
Survivability Improvements - Armor Upgrade Qualification Testing	Armor Upgrade Qualification Testing																											
Survivability Improvements - Armor Upgrade Logistics Product Development	Armor Upgrade Logistics Product Development								Armor Upgrade Logistics Product Development																			
Survivability Improvements - Armor TDP Development	Armor TDP Development								ARAT III																			
Survivability Improvements - CCDO Development	CCDO Development																											
Survivability Improvements - CCDO Testing	CCDO Testing																											
Survivability Improvements - CCDO Platform Integration	CCDO Platform Integration																CCDO Platform Integration											
Survivability Improvements - CCDO Production Contracts	CCDO Production Contracts																				10 CCDO Production Contracts							
Survivability Improvements - CCDO Log Product Development and Provisioning	CCDO Log Product Development and Provisioning																				CCDO Log Product Development and Provisioning							
Survivability Improvements - Top Attack Environmental Testing	Top Attack Environmental Testing								Top Attack Environmental Testing																			
Survivability Improvements - Top Attack Platform Testing	Top Attack Platform Testing								Top Attack Platform Testing																			
Survivability Improvements - Top Attack Integration	Top Attack Integration								Top Attack Integration																			
Survivability Improvements - Top Attack Log Product Development and Provisioning	Top Attack Log Product Development and Provisioning								Top Attack Log Product Development and Provisioning																			
Survivability Improvements - Top Attack Production Contracts	Top Attack Production Contracts																				8 Top Attack Production Contracts							

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite

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
Survivability Improvements - Tranche II Technology Maturation & Development	[Redacted]																											
Survivability Improvements - Government Energetic Qualification Testing	[Redacted]																											
Survivability Improvements - Soft Kill Platform Integration Contract Award	[Redacted]																											
Survivability Improvements - Soft Kill System Development Contract Award	[Redacted]																											
Survivability Improvements - Soft Kill System Development	[Redacted]																											
Survivability Improvements - Soft Kill Platform Integration and Test Support	[Redacted]																											
Radar Sensor Technology - CONOPS and Requirements Development	[Redacted]																											
Radar Sensor Technology - SRR	[Redacted]																											
Radar Sensor Technology - Integration and Testing	[Redacted]																											
Radar Sensor Technology - Final Design Review/Transition	[Redacted]																											
Vehicle Protection Suite Trade Study	[Redacted]																											
Bradley Iron Fist Light Decoupled (IFLD) Phase 2 Testing	[Redacted]																											

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite
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**Schedule Details**

Events	Start		End	
	Quarter	Year	Quarter	Year
Characterization of MAPS with Softkill/Hardkill Solutions	1	2019	4	2019
VPS NDI Capability Install/Characterization	2	2018	3	2021
VPS Trade Study	2	2018	4	2019
VPS MAC Development Contract Awards	1	2021	1	2021
(MAC) with (LWR) - MAC and LWR (MAC) with (LWR) - Maturation and MAF Compliance	4	2019	4	2021
(MAC) with (LWR) - Software Development	4	2019	4	2023
(MAC) with (LWR) -Component Qualification Testing	1	2020	2	2021
(MAC) with (LWR) - Integration Design (Abrams, Bradley, AMPV, Stryker)	1	2021	4	2024
(MAC) with (LWR) - Logistic Product Development	1	2021	1	2026
(MAC) with (LWR) - Integration Contract Awards	3	2021	3	2021
(MAC) with (LWR) - Platform Testing	1	2022	1	2025
(MAC) with (LWR) - Base Kit Improvements Maturation	2	2022	4	2027
(MAC) with (LWR) - Integration Contract Awards	3	2022	3	2022
(MAC) with (LWR) - Procurement Contract Award	4	2022	4	2022
Survivability Improvements Development	1	2020	4	2025
Survivability Improvements - Armor Upgrade Qualification Testing	1	2020	3	2021
Survivability Improvements - Armor Upgrade Logistics Product Development	4	2021	3	2022
Survivability Improvements ? Armor TDP Development	3	2022	4	2022
Survivability Improvements - CCDO Development	1	2020	4	2020
Survivability Improvements - CCDO Testing	1	2021	4	2023
Survivability Improvements - CCDO Platform Integration	1	2024	4	2024
Survivability Improvements - CCDO Production Contracts	2	2025	2	2025

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> FE8 / Vehicle Protection Suite
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Events	Start		End	
	Quarter	Year	Quarter	Year
Survivability Improvements - CCDO Log Product Development and Provisioning	3	2024	4	2024
Survivability Improvements - Top Attack Environmental Testing	1	2021	3	2021
Survivability Improvements - Top Attack Platform Testing	4	2021	2	2022
Survivability Improvements - Top Attack Integration	1	2022	1	2022
Survivability Improvements - Top Attack Log Product Development and Provisioning	3	2021	1	2022
Survivability Improvements - Top Attack Production Contracts	1	2023	1	2023
Survivability Improvements - Tranche II Technology Maturation & Development	3	2020	4	2025
Survivability Improvements ? Government Energetic Qualification Testing	1	2021	4	2022
Survivability Improvements - Soft Kill Platform Integration Contract Award	3	2023	3	2023
Survivability Improvements - Soft Kill System Development Contract Award	2	2022	2	2022
Survivability Improvements - Soft Kill System Development	2	2022	3	2024
Survivability Improvements - Soft Kill Platform Integration and Test Support	4	2023	4	2029
Radar Sensor Technology - CONOPS and Requirements Development	4	2020	2	2021
Radar Sensor Technology - SRR	2	2021	2	2021
Radar Sensor Technology - Integration and Testing	2	2021	1	2022
Radar Sensor Technology - Final Design Review/Transition	2	2022	2	2022
Vehicle Protection Suite Trade Study	1	2023	2	2023
Bradley Iron Fist Light Decoupled (IFLD) Phase 2 Testing	4	2021	4	2022

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> XU9 / Active Protection System
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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
XU9: Active Protection System	-	35.958	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

The Active Protection System effort will install and characterize Non-Developmental Item (NDI) Active Protection Systems on Abrams, Bradley, and Stryker demonstrator vehicles. The Active Protection System effort will assess the maturity, performance, and integration risk of NDI Active Protection Systems, develop and refine Abrams, Bradley, and Stryker Active Protection System installation kit designs, and build prototypes necessary to conduct performance and safety testing to obtain an Active Protection System Urgent Materiel Release (UMR). The Active Protection System NDI effort will also serve to inform the Vehicle Protection Suite Analysis of Alternatives (AoA).

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Active Protection System (APS) Installation Kit Refinement and System Test - Abrams	9.599	-	-
<b>Description:</b> Funding provided supports APS test support for the M1A2 SEPv3			
<b>Title:</b> Active Protection System (APS) Installation Kit Refinement and System Test - Bradley	26.359	-	-
<b>Description:</b> Funding provided support APS integration and test support for Bradley			
<b>Accomplishments/Planned Programs Subtotals</b>	35.958	-	-

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

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• GA0700: M1 Abrams Tank (MOD)	325.292	375.107	-	-	-	-	-	-	-	-	-
• GZ2400: Bradley Program (MOD)	415.740	277.259	461.385	-	461.385	-	-	-	-	-	-
• GM0100: Stryker (Mod)	397.687	-	-	-	-	-	-	-	-	-	-

**Remarks**

Stryker is not resourced to procure any active protection systems.

**D. Acquisition Strategy**

The Active Protection System Project XU9 is a continuation of efforts previously executed under PE 0203735A - Combat Vehicle Improvement Programs.

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> XU9 / Active Protection System
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The APS installation and characterization effort will evaluate platform (Abrams, Bradley, Stryker) performance with an NDI APS solution installed. Platform performance evaluation includes APS sensor assessments, minimum live threat characterization, surface danger zone characterization, co-site mitigation (antennas/radiators), electromagnetic interference assessment/characterization, energetic radiation assessment, and a durability assessment. The NDI APS installation and characterization is being executed through a partnership between the US Army, NDI APS solution vendors, and prime contractors for Abrams, Bradley, and Stryker vehicles. NDI APS vendor support, to include procurement of demonstration hardware, is contracted on a Firm-Fixed Price (FFP) basis, while platform prime contractor technical support is provided on a Cost Plus Fixed-Fee (CPFF) basis. The results from the installation and characterization effort has resulted in moving forward with installation design refinement and required testing to meet urgent fielding of NDI APS on Abrams and Bradley. Characterization of APS solutions for Stryker revealed that while they were capable of intercepting threats, no solutions were suitable for Stryker. Continued limited characterizations of APS solutions are planned to better understand their functionality, generate performance data, and determine if future integration onto a Stryker platform is feasible.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> XU9 / Active Protection System
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<b>Product Development (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Active Protection System (APS) Installation Kit Development and Prototype Build - Abrams	SS/ Various	US Army TARDEC; Rafael Advanced Defense Systems; General Dynamics Land Systems (GDLS) : Warren, MI	9.902	-		-		-		-		-	0.000	9.902	-
Active Protection System (APS) Installation Kit Development and Prototype Build - Bradley	SS/ Various	US Army TARDEC; Israeli Military Industries (IMI); BAE Systems : Warren, MI	32.552	26.183	Feb 2020	-		-		-		-	0.000	58.735	-
Active Protection System (APS) Installation Kit Development and Prototype Build - Stryker	SS/ Various	US Army TARDEC; Artis, LLC.; General Dynamics Land Systems (GDLS) : Warren, MI	0.061	-		-		-		-		-	0.000	0.061	-
Active Protection System (APS) Installation Kit Development and Prototype Build - 4th System	C/CPIF	Contract : Texas	25.000	-		-		-		-		-	0.000	25.000	-
<b>Subtotal</b>			67.515	26.183		-		-		-		-	0.000	93.698	N/A

<b>Support (\$ 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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
Program Management Office (PMO) Support	MIPR	PEO Ground Combat Systems : Warren, MI	3.456	0.176	Jul 2020	-		-		-		-	0.000	3.632	-
<b>Subtotal</b>			3.456	0.176		-		-		-		-	0.000	3.632	N/A





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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> XU9 / Active Protection System

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
Abrams APS Installation Kit (IK) Refinement, Prototype Build, & Test																												
Abrams IK Refinement/Prototype Build/Test																												
Abrams APS Production																												
Abrams Production																												
Bradley APS Installation Kit (IK) Refinement, Prototype Build, & Test																												
Bradley IK Refinement/Prototype Build/Test																												
Bradley APS Production																												
Bradley Production																												
Stryker Continued Additional APS Refinement/Prototype Build																												
Stryker Continued Additional APS Refinement/Prototype Build																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604852A / Suite of Survivability Enhancement Systems - EMD	<b>Project (Number/Name)</b> XU9 / Active Protection System

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Abrams APS Demonstrator Design and Install	3	2016	1	2017
Abrams APS Characterization	1	2017	4	2017
Abrams APS Decision Point (DP) 1 (Production)	1	2018	1	2018
Abrams APS Installation Kit (IK) Refinement, Prototype Build, & Test	1	2018	1	2021
Abrams APS Decision Point (DP) 2 (Production)	2	2018	2	2018
Abrams APS Production	2	2018	1	2020
Bradley APS Demonstrator Design and Install	4	2016	4	2017
Bradley APS Characterization	4	2017	3	2018
Bradley APS Decision Point (DP) 1 (Production)	1	2019	1	2019
Bradley APS Installation Kit (IK) Refinement, Prototype Build, & Test	1	2019	4	2020
Bradley APS Decision Point (DP) 2 (Production)	2	2019	2	2019
Bradley APS Production	1	2019	2	2020
Stryker APS Demonstrator Design and Install	4	2016	3	2017
Stryker APS Characterization	4	2017	2	2018
Stryker APS Decision Point (DP) 1 (Production)	2	2018	2	2018
Stryker APS Installation Kit (IK) Refinement, Prototype Build, & Test	3	2018	2	2019
Stryker APS Decision Point (DP) 2 (Production)	2	2019	2	2019
Stryker Additional APS Demonstration	1	2019	2	2019
Stryker Continued Additional APS Refinement/Prototype Build	4	2019	4	2020

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</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	-	20.290	36.187	-	-	-	-	-	-	-	-	-
509: <i>LIGHTWEIGHT 155M HOWITZER</i>	-	7.318	-	-	-	-	-	-	-	-	-	-
HB6: <i>Mobile 155MM Howitzer</i>	-	12.972	36.187	-	-	-	-	-	-	-	-	-

**Note**

Elimination: Project HB6 has no funding request for Fiscal Year (FY) 2022.

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

This program element encompasses engineering and manufacturing development for artillery weapons systems.

Project 509 supports the Lightweight 155mm Howitzer (LW155), also known as the M777A2, which is a Joint Service program between the United States Marine Corps (USMC) and US Army which provides direct, reinforcing, general support fires to maneuver forces and direct support artillery. The LW155 was first introduced into the USMC in April 2005 and the Marines have fielded the howitzer to all active units. The Army fielded the howitzer to its Stryker Brigade Combat teams (SBCT), Fires Brigades, National Guard and Infantry Brigade Combat Teams (IBCT). The LW155 fires unassisted projectiles to a range of 30 kilometers (km) and assisted projectiles to 40km. It is a successful joint service program between the USMC and US Army working together to develop, produce, field, and sustain the howitzer. The howitzer will be going through obsolescent replacement of electronic components in its digital fire control system, since it has been in the field for more than ten years.

Current development efforts are focused on extending the range of the LW155 to reduce the threat of being out ranged by potential adversaries and meeting the range key performance parameter objective distance (greater than 40km) as stated in the Joint US Army, USMC Operational Requirements Document (JORD) for Advanced Towed Cannon System, but deferred during Engineering Manufacturing and Development due to technology maturity, cost and schedule. The USMC and US Army are leveraging technology being developed as part of the Extended Range Cannon Artillery (ERCA) program by the US Army. The ERCA program is a suite of technologies, cannon, ammunition and fire control, to increase the range of cannon artillery to exceed peer competitors range (greater than 70km). An operational demonstration of the M777 Extended Range (M777ER) howitzer will be conducted at the end of FY 2020 to assess the performance of best available projectiles and objective hardware of M777ER howitzer.

Project HB6 supports the mobile howitzer program. The Mobile 155mm Howitzer is a Self-Propelled, 155mm Wheeled Howitzer that provides lethal, proactive counter-fire essential for the survivability of the maneuver formations and other close support fires as required. The Mobile Howitzer improves the Field Artillery Battalion's ability to maintain pace with its supporting maneuver formations and survive against responsive, counter-fire from near-peer threats with rapid displacement and emplacement times. The mobile howitzer will improve tactical mobility and system survivability compared to existing towed howitzer systems. Development efforts, prototyping and evaluations will focus on attributes such as improved emplacement and displacement times, driving speed, and crew protection capabilities, all without sacrificing lethality versus existing towed howitzer systems. Program activities in FY 2021 will be focused on evaluation of multiple vendor mobile howitzer systems at United

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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 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>
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States proving grounds against system requirements. Evaluation will include safety testing, US ammunition compatibility testing, and assessment of mobility, survivability and transportability.

<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	10.732	11.611	35.263	-	35.263
Current President's Budget	20.290	36.187	0.000	-	0.000
Total Adjustments	9.558	24.576	-35.263	-	-35.263
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	25.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	10.000	-			
• SBIR/STTR Transfer	-0.442	-0.424			
• Adjustments to Budget Years	-	-	-35.263	-	-35.263

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** HB6: *Mobile 155MM Howitzer*

Congressional Add: *105MM Mobile Howitzer Evaluation*

Congressional Add: *Soft Recoil Development*

Congressional Add Subtotals for Project: HB6

Congressional Add Totals for all Projects

	<b>FY 2020</b>	<b>FY 2021</b>
	10.000	-
	-	25.000
Congressional Add Subtotals for Project: HB6	10.000	25.000
Congressional Add Totals for all Projects	10.000	25.000

**Change Summary Explanation**

Decrease of \$35,263K from FY21 to FY22 is the result of the completion of the 155mm Mobile Howitzer System Evaluation.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> 509 / <i>LIGHTWEIGHT 155M HOWITZER</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
509: <i>LIGHTWEIGHT 155M HOWITZER</i>	-	7.318	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The Lightweight 155 millimeter (mm) Howitzer (LW155), also known as the M777A2, is a Joint Service program between the United States Marine Corps (USMC) and United States Army which provides direct, reinforcing, general support fires to maneuver forces and direct support artillery. The LW155 was first introduced into the USMC in April 2005 and the Marines have fielded the howitzer to all active units. The Army fielded the howitzer to its Stryker Brigade Combat teams (SBCT), Fires Brigades, National Guard and Infantry Brigade Combat Teams (IBCT). The LW155 saw extensive action in Afghanistan, receiving high marks for its performance. It replaces all howitzers in all USMC missions and replaces the M198 howitzer as the general support artillery for light forces in the Army. The LW155 fires unassisted projectiles to a range of 30 kilometers (km) and assisted projectiles to 40km. The addition of the digital fire control system enables the weapon to program and fire the improved Excalibur precision-guided munitions to ranges in excess of 40km with better than 10-meter Circular Error Probable (CEP) accuracy. The LW155 is the first ground combat system whose major structures are made of high strength titanium alloy and the system makes extensive use of hydraulics to operate the breech, load tray, recoil and wheel arms. It is a successful joint service program between the USMC and United States Army working together to develop, produce, field, and sustain the howitzer. The howitzer will be going through obsolescent replacement of electronic components in its digital fire control system, since it has been in the field for more than ten years.

Production and fielding of the LW155 concluded and entered into the Sustainment Life Cycle Phase. Current development efforts are focused on extending the range of the LW155 to reduce the threat of being out ranged by potential adversaries and meeting the range key performance parameter objective distance (greater than 40km) as stated in the Joint United States Army, USMC Operational Requirements Document (JORD) for Advanced Towed Cannon System, but deferred during Engineering Manufacturing and Development due to technology maturity, cost and schedule. The USMC and United States Army are leveraging technology being developed as part of the Extended Range Cannon Artillery (ERCA) program by the United States Army. The ERCA program is a suite of technologies, cannon, ammunition and fire control, to increase the range of cannon artillery to exceed peer competitors range (greater than 70km). An operational demonstration of the M777 Extended Range (M777ER) howitzer will be conducted at the end of FY 2020 to assess the performance of best available projectiles and objective hardware of M777ER howitzer.

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

	FY 2020	FY 2021	FY 2022
<b>Title:</b> Product Development	5.491	-	-
<b>Description:</b> Funds engineering support from the Armaments Research Development and Engineering Center			
<b>Title:</b> Operational Assessment	1.827	-	-
<b>Description:</b> Funding will support operational assessment of M777 Extended Range Howitzer in a controlled test environment.			
<b>Accomplishments/Planned Programs Subtotals</b>	7.318	-	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> 509 / <i>LIGHTWEIGHT 155M HOWITZER</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• GZ1700: <i>M777 Mods</i>	2.367	9.783	21.976	-	21.976	-	-	-	-	-	-

**Remarks**

Procurement funding supports active retrofits and hardware refresh for previously contracted Digital Fire Control System components, addressing obsolescence.

**D. Acquisition Strategy**

Production and fielding of the M777A2 has concluded and has now entered into the Sustainment Life Cycle Phase. Current Research Development Test & Evaluation (RDTE) efforts are focused on extending the range of the M777A2 to reduce the threat of being out ranged by potential adversaries and meeting the range key performance parameter objective distance (>40 KM) as stated in the Joint US Army, USMC JORD for Advanced Towed Cannon System, but deferred during Engineering Manufacturing and Development due to technology maturity, cost and schedule. The USMC and US Army are leveraging technology being developed as part of the ERCA program by the US Army. The ERCA program is a suite of technologies, cannon, ammunition and fire control, to increase the range of cannon artillery to exceed peer competitors range (>70KM). An operational demonstration of the M777 Extended Range howitzer will be begin at the end of FY 2020 to support the decision point for procurement in support of an Urgent Materiel Release.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> 509 / <i>LIGHTWEIGHT 155M HOWITZER</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 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			
Program Management	Sub Allot	Program Management Towed Artillery Systems : Picatinny Arsenal, NJ	0.998	-		-		-		-		-	0.000	0.998	Continuing
<b>Subtotal</b>			0.998	-		-		-		-		-	0.000	0.998	N/A

<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			
Engineering	MIPR	Armaments Research & Developmet Center : Picatinny Arsenal, NJ	8.474	5.491	Nov 2019	-		-		-		-	0.000	13.965	Continuing
Long Lead Prototypes	MIPR	Watervliet Arsenal : Watervliet, NY	1.920	-		-		-		-		-	0.000	1.920	Continuing
<b>Subtotal</b>			10.394	5.491		-		-		-		-	0.000	15.885	N/A

**Remarks**  
FY 2020 increase funds the operational assessment of the M777 Extended Range (M777ER) howitzer for the Army's modernization Long Range Precision Fires.

<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			
Operational Assessment	MIPR	Army Test & Evaluation Command : Yuma, AZ	-	1.827	Jul 2020	-		-		-		-	0.000	1.827	Continuing
<b>Subtotal</b>			-	1.827		-		-		-		-	0.000	1.827	N/A

**Remarks**  
FY2020 increase funds test center costs in support of the Operational Assessment at Yuma Test Center.





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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> 509 / <i>LIGHTWEIGHT 155M HOWITZER</i>
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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
Prototype Hardware Integration																												
Operational Demonstration																												

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> 509 / <i>LIGHTWEIGHT 155M HOWITZER</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
XM907 Common Cannon Assembly Support	1	2015	2	2019
Objective M777ER Design, Analysis & Drawings	1	2015	1	2019
Objective M777ER Component Fabrication	2	2018	3	2019
Prototype Hardware Integration	1	2019	3	2020
Operational Demonstration	4	2020	2	2021

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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 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>				<b>Project (Number/Name)</b> HB6 / <i>Mobile 155MM Howitzer</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>
HB6: <i>Mobile 155MM Howitzer</i>	-	12.972	36.187	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Elimination: Project HB6 has no funding request for Fiscal Year (FY) 2022.

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

Project HB6 supports the mobile howitzer program. The Mobile 155 millimeter (mm) Howitzer is a Self-Propelled, 155mm Wheeled Howitzer that provides lethal, proactive counter-fire essential for the survivability of the maneuver formations and other close support fires as required. The Mobile Howitzer improves the Field Artillery Battalion's ability to maintain pace with its supporting maneuver formations and survive against responsive, counter-fire from near-peer threats with rapid displacement and emplacement times. The mobile howitzer will improve tactical mobility and system survivability compared to existing towed howitzer systems. Development efforts, prototyping and evaluations will focus on attributes such as improved emplacement and displacement times, driving speed, and crew protection capabilities, all without sacrificing lethality versus existing and future towed howitzer systems.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Mobile Howitzer Analysis <b>Description:</b> Conducts analysis of prototype and existing mobile howitzers.	2.972	-	-
<b>Title:</b> Testing and Engineering Support <b>Description:</b> Live fire testing of Mobile Howitzer and associated engineering support.  <b>FY 2021 Plans:</b> Funding will provide range time for United States (US) ammunition compatibility testing and system safety release to mature systems for operational evaluation. <b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Decrease from FY 2021 to FY 2022 reflects the completion of testing.	-	8.802	-
<b>Title:</b> Bid Sample Test <b>Description:</b> Funding will support engineering and operational evaluation of Mobile Howitzer vendor systems against the Operational Needs Statement (ONS).  <b>FY 2021 Plans:</b>	-	2.385	-

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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 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> HB6 / <i>Mobile 155MM Howitzer</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022
Funding will support engineering and operational evaluation of Mobile Howitzer vendor systems.			
<b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Decrease from FY 2021 to FY 2022 reflects the completion of testing.			
<b>Accomplishments/Planned Programs Subtotals</b>	2.972	11.187	-

	FY 2020	FY 2021
<b><i>Congressional Add:</i></b> 105MM Mobile Howitzer Evaluation	10.000	-
<b><i>FY 2020 Accomplishments:</i></b> Funds procure test systems from the potential vendor and test system to support safe operational use by soldiers.		
<b><i>Congressional Add:</i></b> Soft Recoil Development	-	25.000
<b><i>FY 2021 Plans:</i></b> Funds support the engineering and development of the soft recoil system.		
<b>Congressional Adds Subtotals</b>	10.000	25.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy for the Mobile Howitzer Program is to evaluate existing industry prototypes and fielded systems and assess capability of mobility and survivability attributes. Evaluation will be conducted by US Army engineers and the Army Test and Evaluation Command.

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / Artillery Systems - EMD	<b>Project (Number/Name)</b> HB6 / Mobile 155MM Howitzer
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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			
Mobile Howitzer Analysis	MIPR	Combat Capability Development Command, Armaments Center : Picatinny Arsenal, NJ	-	2.972	Oct 2019	-		-		-		-	0.000	2.972	-
Soft Recoil Development	TBD	PM Towed Artillery Systems : Picatinny Arsenal, NJ	-	-		25.000	Mar 2021	-		-		-	0.000	25.000	-
<b>Subtotal</b>			-	2.972		25.000		-		-		-	0.000	27.972	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			
Testing and Engineering Support	MIPR	Yuma Test Center / Combat Capability Development Command, Armaments Center : Yuma, AZ / Picatinny, NJ	-	-		8.802	Oct 2020	-		-		-	Continuing	Continuing	-
Bid Sample Test	MIPR	Yuma Test Center : Yuma, AZ	-	-		2.385	Jul 2021	-		-		-	0.000	2.385	-
105MM Mobile Howitzer Evaluation	SS/FFP	Army Contracting Command New Jersey : Various	-	10.000		-		-		-		-	0.000	10.000	-
<b>Subtotal</b>			-	10.000		11.187		-		-		-	Continuing	Continuing	N/A

	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>			-	12.972	36.187	-	-	-	Continuing	Continuing

**Remarks**

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> HB6 / <i>Mobile 155MM Howitzer</i>
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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
Mobile Howitzer Analysis	██████████																											
Testing and Engineering Support	██████████																											
Bid Sample Test	██████████																											
105MM Mobile Howitzer System Evaluation	██████████																											
Soft Recoil Development	██████████																											

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

<b>Appropriation/Budget Activity</b> 2040 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604854A / <i>Artillery Systems - EMD</i>	<b>Project (Number/Name)</b> HB6 / <i>Mobile 155MM Howitzer</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mobile Howitzer Analysis	1	2020	3	2020
Testing and Engineering Support	3	2020	4	2021
Bid Sample Test	3	2021	4	2021
105MM Mobile Howitzer System Evaluation	2	2021	4	2021
Soft Recoil Development	2	2021	4	2022