Department of Defense
Fiscal Year (FY) 2023 Budget Estimates

April 2022

Army

Justification Book Volume 2c of 2

Research, Development, Test & Evaluation, Army

RDT&E − Volume II, Budget Activity 5B

Volume 2c Table of Contents

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY
APPROPRIATION LANGUAGE

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, $13,703,609,000.00 to remain available for obligation until September 30, 2024.

The FY 2023 Overseas Operations accounted for in the base budget are as follows:

Combat or direct combat support expenses that discontinue once combat operations end at major contingency location $12,800,000.

In-theater and in-CONUS expenses that remain after combat operations cease and have been previously funded in OCO $5,875,000.

COST STATEMENT

The following Justification Books were prepared at a cost of $474,495.00: 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 5D, Budget Activity 6, Budget Activity 7, and Budget Activity 8.

FY 2023 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 2022.

2. Relationship of the FY 2023 Budget Submitted to Congress to the FY 2022 Budget Submitted to Congress. This paragraph provides a list of program elements/projects that are major new starts, restructures, developmental transitions, and terminated programs. Explanations for these changes can be found in the narrative sections of the Program Element R-2A Exhibits.

New Start Programs:

Budget Activity	***OSDPE / Project***	***Project Title***
02	0602002A / DC4	Army Applied Innovation
02	0602002A / DC5	Team Ignite
02	0602141A / CI1	Advanced Armaments Lethality Technology
02	0602141A / CZ9	Foundational Hypersonic Weapons Research
02	0602144A / CV3	Engineer Enablers Maneuver, LOG, & Sustainment Apl
02	0602144A / DA1	SAFR Alternatives for Readiness Applied Research
02	0602145A / CU5	Platform Agnostic Armaments Applied Technology
02	0602146A / CU6	Adaptive Information Mediation and Analytics
02	0602146A / CV4	Pathfinder 3D Applied Technology
02	0602150A / CV7	High Energy Laser Direct Diode Apl Tech
02	0602150A / CV8	Vulnerability Modules for Multi-Domain Operations
02	0602150A / DA9	Radar Survivability through Dis Sensing Tech
02	0602180A / DA5	AI Enabled Talent Management Applied Research
02	0602180A / DA6	AI-Enabled Command and Coordination Apl Research
02	0602183A / CU7	Control & Autonomy for Tactical Superiority Tech
02	0602183A / CU8	Structures Tech for Enduring Efficient Resilience

02	0602183A / CU9	Systems Design Technology
02	0602184A / CV9	Technical-SAVVY Soldier Applied Research
03	0603025A / DA3	Army Advanced Innovation
03	0603040A / CN6	Predictive Maintenance Advanced Technology
03	0603040A / DA7	AI-Enabled Command and Coordination Adv Tech
03	0603041A / DA4	All Domain Convergence Engineering & Architectures
03	0603043A / CV1	Control & Autonomy for Tactical Superiority Adv
03	0603043A / CV2	Structures Platform Int Resilience & Efficiency
03	0603119A / CV5	Engineer Enablers Maneuver, LOG, & Sustainment Adv
03	0603119A / DA2	SAFR Alternatives for Readiness Advanced Tech
03	0603466A / CV6	Optimized High Energy Laser Source Adv Tech
03	0603466A / DB3	Radar Survivability through Dis Sensing Adv Tech
04	0604020A / DC8	Army Experimentation and Prototyping
05	0604641A / CF5	Robotic Combat Vehicle (BA5) NGCV-CFT
05	0604827A / S65	Platoon Power Generator
05	0604854A / 516	Paladin/FAASV
06	0605235A / CQ4	Mid-Range Capability

Program Element/Project Restructures:

Budget Activity	***Old OSDPE / Project: Title***	***New OSDPE / Project***
02	0602143A / BE6: Reactive/Resp Surfaces & Matls-Soldiers & Sys	0602184A / CW9
02	0602146A / AΘ2: Stand-In Advanced RF Effects (STARE)	0602146A / AP5
02	0602146A / AR3: Intelligent Environmental Battlefield Awareness	0602182A / CX3
02	0602146A / AR7: Sensing in Contested Environments Technology	0602182A / CX5
02	0602146A / AR9: Persistent Geophysical Sensing-Infrasound Tech	0602182A / CX4
02	0602146A / AT2: Subterranean Detection and Monitoring Technology	0602182A / CX6
02	0602146A / AV7: Atmospheric Modeling and Meterological Technology	0602182A / CW2
02	0602146A / CK1: Assurred PNT Enabling Technologies	0602182A / CZ6
02	0602148A / AI9: Future UAS Engine Technology	0602183A / CW6

02	0602148A / AJ2: Next Generation Rotorcraft Transmission Technology	0602183A / CW8
02	0602148A / AJ6: Advanced Rotors Technology	0602183A / CW3
02	0602148A / AJ8: Experimental and Computational Aeromechanics Techn	0602183A / CW5
02	0602148A / AL2: High Performance Computing for Rotorcraft App Tech	0602183A / DC2
02	0602148A / AL4: High Speed and Efficient VTOL Vehicle Technology	0602183A / CW7
02	0602148A / AL5: Air Vehicle Structures and Dynamics Technology	0602183A / CW4
02	0602148A / AL8: Holistic Situational Awareness and Dec Making Tech	0602141A / CG4
02	0602150A / AD2: High Energy Laser (HEL) Enabling and Support Techn	0602150A / DC1
02	0602150A / AD3: Maneuver Air Defense Technology	0603466A / AD4
02	0602182A / CM9: Convergent CEMA Deception	0602182A / CZ7
03	0602145A / BJ9: Autonomous Mobility Tech	0603462A / BK1
03	0602146A / AM8: Protected SATCOM Technology	0603463A / AM9
03	0602148A / AK4: Multi-Role Small Guided Missile Technology	0603465A / AK5
03	0603463A / AR4: Intelligent Env Battlefield Awareness Adv Tech	0603042A / CX7
03	0603463A / AS9: Persistent Geophysical Sensing-Infrasound Adv Tech	0603042A / CX8
03	0603463A / AR8: Sensing in Contested Environments Adv Technology	0603042A / CX9
03	0603463A / AT3: Subterranean Detection and Monitoring Adv Technology	0603042A / CZ5
03	0603465A / AJ7: Advanced Rotors Advanced Technology	0603043A / CX1
03	0603043A / AJ3: Next Generation Rotorcraft Transmission Adv Technology	0603043A / CX2
03	0603043A / AL3: HPC for Rotorcraft Applications Adv Tech	0603043A / DC3
03	0603463A / AU2: Optimization of Geospatial Data for Visualization	0603463A / AT8
03	0603463A / AV1: GEOInt/Ops Logistics Integration-Planning Adv Tech	0603463A / AU4
03	0602147A / AF1: Long Range Maneuverable Fires (LRMF) Technology	0603464A / AF2
03	0603464A / AE8: Land-Based Anti-Ship Missile (LBASM) Advanced Tech	0603464A / CZ8
03	0603465A / CH6: Adapt & Resilnt Tach Autnmy Cont&Struct Adv Tech	0603043A / CV1
03	0603465A / CH6: Adapt & Resilnt Tach Autnmy Cont&Struct Adv Tech	0603043A / CV2
03	0603465A / CH8: UAS Survivability Advance Technology	0603465A / AK3
03	0603465A / CH8: UAS Survivability Advance Technology	0603465A / CG1
03	0602148A / BZ7: Future Vertical Lift Medical Technologies	0603465A / CJ5
04	0603466A / AD1: High Energy Laser Tactical Vehicle Demo Adv Tech	0604019A / BU9
04	0305251A / FA8: Cyberspace Operations Forces and Force Support	0305251A / DD3
04	0603801A / B47: Future Vertical Lift	0603801A / CS7
04	0604117A / FI4: Maneuver - Short Range Air Defense (M-SHORAD)	0604117A / CR9
04	0605054A / FI3: Rapid Capability Development and Maturation	0604117A / CR9
04	0604117A / FI4: Maneuver - Short Range Air Defense (M-SHORAD)	0604117A / CS1

04	0604644A / MR1: Mobile Intermediate Range Missile	0604135A / MR2
04	0604644A / MR1: Mobile Intermediate Range Missile	0604135A / MR3
04	0604644A / MR1: Mobile Intermediate Range Missile	0604135A / MR4
04	0604182A / HX1: Long Range Hypersonic Weapon	0604182A / HX3
04	0604182A / HX1: Long Range Hypersonic Weapon	0604182A / HX4
04	0604182A / HX1: Long Range Hypersonic Weapon	0604182A / HX5
04	0604182A / HX1: Long Range Hypersonic Weapon	0604182A / HX6
05	0604818A / EJ5: Mounted Computing Environment (MCE)	0604805A / 593
05	0605013A / T05: Army Business System Modernization Initiatives	0605013A / BY3
05	0608041A / CD1: Defensive Cyber - Software Prototype Devel	0605041A / XU3
05	0605042A / FA1: Manpack Radio	0605236A / CQ1
05	0605042A / FA2: Rifleman Radio (RR)	0605236A / CQ1
06	0605602A / 628: Developmental Test Technology & Sustainment	0605602A / FJ3
06	0605602A / 62C: Modeling and Simulation Instrumentation	0605602A / FJ3
07	0303142A / 456: MILSATCOM System Engineering	0303142A / CO7
07	0205778A / EG2: GMLRS Alternative Warheads	0205778A / EG3

Program Terminations (including transfers to Procurement and Sustainment):

Budget Activity	***OSDPE / Project***	***Project Title***
01	0601104A / CI9	University & Industry Rsch Ctrs / Strategic University Basic Research Alliance
02	0602141A / CJ6	Lethality Technology / Advanced Energetics for Missile Technologies
02	0602143A / BB9	Soldier Lethality Technology / Human Performance Tech for Mobility & Lethality
02	0602144A / CG5	Ground Technology / Ground Vehicle Sensor Concepts and Technologies
02	0602146A / AR1	Network C3I Technology / Robust, Resilient and Intelligent C3I Technology
02	0602150A / AD5	Air and Missile Defense Technology / Next Generation Fires Radar Technology
03	0603002A / MN3	Medical Advanced Technology / Immediate Cardiopulmonary Stabilization Adv Tech
03	0603002A / MN4	Medical Advanced Technology / Advanced Life Support Advanced Technology
03	0603002A / MN5	Medical Advanced Technology / Next Generation Blood Products Advanced Technology
03	0603002A / MN9	Medical Advanced Technology / Far Forward Behavioral Health Care Advanced Tech

03	0603463A / AN2	Network C3I Advanced Technology / Narrowband SATCOM Advanced Technology
03	0603466A / AD4	Air and Missile Defense Adv Technology / Maneuver Air Defense Advanced Technology
04	0604785A / DS4	Integrated Base Defense / Integrated Base Defense
05	0604854A / HB6	Artillery Systems EMD / Mobile 155MM Howitzer

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

Department of the Army
FY 2023 President's Budget
Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Apr 2022

Summary Recap of Budget Activities	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request
Basic Research	552,521	606,509	466,823
Applied Research	1,518,220	1,529,888	883,759
Advanced Technology Development	1,948,792	2,190,430	1,392,065
Advanced Component Development & Prototypes	3,589,313	3,818,276	4,098,749
System Development & Demonstration	2,979,946	3,254,230	4,031,334
Management Support	1,832,049	1,553,905	1,554,252
Operational Systems Development	1,719,691	1,466,180	1,188,403
Software and Digital Technology Pilot Programs	56,706	108,841	94,888
Total Research, Development, Test & Evaluation	**14,197,238**	**14,528,259**	**13,710,273**

Summary Recap of FYDP Programs			
General Purpose Forces	589,523	579,473	392,489
Intelligence and Communications	372,869	275,873	210,597
Research and Development	13,099,825	13,566,200	13,009,253
Central Supply and Maintenance	130,785	103,720	91,270
Administration and Associated Activities	253		
Classified Programs	3,983	2,993	6,664
Total Research, Development, Test & Evaluation	**14,197,238**	**14,528,259**	**13,710,273**

Department of the Army
FY 2023 President's Budget
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Total Obligational Authority
(Dollars in Thousands)

Apr 2022

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
1	0601102A	Defense Research Sciences	01	344,031	368,751	279,328	U
2	0601103A	University Research Initiatives	01	84,697	91,241	70,775	U
3	0601104A	University and Industry Research Centers	01	118,716	126,267	100,909	U
4	0601121A	Cyber Collaborative Research Alliance	01	5,077	5,067	5,355	U
5	0601601A	Artificial Intelligence and Machine Learning Basic Research	01		15,183	10,456	U
	Basic Research			**552,521**	**606,509**	**466,823**	
6	0602002A	Army Agile Innovation and Development-Applied Research	02			9,534	U
7	0602115A	Biomedical Technology	02	11,403	11,925		U
8	0602134A	Counter Improvised-Threat Advanced Studies	02	1,927	1,976	6,192	U
9	0602141A	Lethality Technology	02	117,484	91,626	87,717	U
10	0602142A	Army Applied Research	02	29,257	28,654	27,833	U
11	0602143A	Soldier Lethality Technology	02	201,511	205,058	103,839	U
12	0602144A	Ground Technology	02	159,358	216,550	52,848	U
13	0602145A	Next Generation Combat Vehicle Technology	02	258,341	245,525	174,090	U
14	0602146A	Network C3I Technology	02	202,256	164,804	64,115	U
15	0602147A	Long Range Precision Fires Technology	02	119,007	93,785	43,029	U
16	0602148A	Future Verticle Lift Technology	02	169,536	133,158	69,348	U
17	0602150A	Air and Missile Defense Technology	02	107,584	93,549	27,016	U
18	0602180A	Artificial Intelligence and Machine Learning Technologies	02		15,034	16,454	U
19	0602181A	All Domain Convergence Applied Research	02		25,967	27,399	U
20	0602182A	C3I Applied Research	02		12,406	27,892	U
21	0602183A	Air Platform Applied Research	02		6,597	41,588	U

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Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
22	0602184A	Soldier Applied Research	02		11,064	15,716	U
23	0602213A	C3I Applied Cyber	02	18,816	12,119	13,605	U
24	0602386A	Biotechnology for Materials - Applied Research	02		20,643	21,919	U
25	0602785A	Manpower/Personnel/Training Technology	02	20,399	18,701	19,649	U
26	0602787A	Medical Technology	02	101,341	120,747	33,976	U
	Applied Research			**1,518,220**	**1,529,888**	**883,759**	
27	0603002A	Medical Advanced Technology	03	95,146	137,804	5,207	U
28	0603007A	Manpower, Personnel and Training Advanced Technology	03	11,344	14,273	15,598	U
29	0603025A	Army Agile Innovation and Demonstration	03		22,231	20,900	U
30	0603040A	Artificial Intelligence and Machine Learning Advanced Technologies	03		909	6,395	U
31	0603041A	All Domain Convergence Advanced Technology	03		17,743	45,463	U
32	0603042A	C3I Advanced Technology	03		3,151	12,716	U
33	0603043A	Air Platform Advanced Technology	03		754	17,946	U
34	0603044A	Soldier Advanced Technology	03		890	479	U
35	0603115A	Medical Development	03	26,711	26,508		U
36	0603116A	Lethality Advanced Technology	03		8,066	9,796	U
37	0603117A	Army Advanced Technology Development	03	64,163	76,815	134,874	U
38	0603118A	Soldier Lethality Advanced Technology	03	154,161	152,369	100,935	U
39	0603119A	Ground Advanced Technology	03	196,055	280,490	32,546	U
40	0603134A	Counter Improvised-Threat Simulation	03	24,087	24,747	21,486	U
41	0603386A	Biotechnology for Materials - Advanced Research	03		53,736	56,853	U
42	0603457A	C3I Cyber Advanced Development	03	43,357	61,426	41,354	U

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Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
43	0603461A	High Performance Computing Modernization Program	03	221,161	229,123	251,964	U
44	0603462A	Next Generation Combat Vehicle Advanced Technology	03	309,860	299,712	193,242	U
45	0603463A	Network C3I Advanced Technology	03	215,337	211,068	125,565	U
46	0603464A	Long Range Precision Fires Advanced Technology	03	177,142	141,909	100,830	U
47	0603465A	Future Vertical Lift Advanced Technology	03	220,334	261,880	177,836	U
48	0603466A	Air and Missile Defense Advanced Technology	03	173,244	145,826	11,147	U
49	0603920A	Humanitarian Demining	03	16,690	19,000	8,933	U
		Advanced Technology Development		**1,948,792**	**2,190,430**	**1,392,065**	
50	0603305A	Army Missle Defense Systems Integration	04	139,518	56,702	12,001	U
51	0603308A	Army Space Systems Integration	04	25,584	25,755	17,945	U
52	0603327A	Air and Missile Defense Systems Engineering	04	47,098	15,000		U
53	0603619A	Landmine Warfare and Barrier - Adv Dev	04	56,067	46,637	64,001	U
54	0603639A	Tank and Medium Caliber Ammunition	04	106,881	73,844	64,669	U
55	0603645A	Armored System Modernization - Adv Dev	04	130,485	164,328	49,944	U
56	0603747A	Soldier Support and Survivability	04	5,312	2,897	4,060	U
57	0603766A	Tactical Electronic Surveillance System - Adv Dev	04	182,400	113,365	72,314	U
58	0603774A	Night Vision Systems Advanced Development	04	15,179	62,820	18,048	U
59	0603779A	Environmental Quality Technology - Dem/Val	04	20,906	22,921	31,249	U
60	0603790A	NATO Research and Development	04	4,589	3,777	3,805	U
61	0603801A	Aviation - Adv Dev	04	694,296	1,178,460	1,162,344	U
62	0603804A	Logistics and Engineer Equipment - Adv Dev	04	15,287	11,055	9,638	U
63	0603807A	Medical Systems - Adv Dev	04	36,006	37,053	598	U

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64	0603827A	Soldier Systems - Advanced Development	04	23,905	25,925	25,971	U
65	0604017A	Robotics Development	04	92,401	80,525	26,594	U
66	0604019A	Expanded Mission Area Missile (EMAM)	04		27,872	220,820	U
67	0604020A	Cross Functional Team (CFT) Advanced Development & Prototyping	04			106,000	U
68	0604021A	Electronic Warfare Technology Maturation (MIP)	04	15,034			U
69	0604035A	Low Earth Orbit (LEO) Satellite Capability	04	21,850	19,638	35,509	U
70	0604036A	Multi-Domain Sensing System (MDSS) Adv Dev	04		50,548	49,932	U
71	0604037A	Tactical Intel Targeting Access Node (TITAN) Adv Dev	04		28,347	863	U
72	0604100A	Analysis Of Alternatives	04	9,714	10,091	10,659	U
73	0604101A	Small Unmanned Aerial Vehicle (SUAV) (6.4)	04	1,328	926	1,425	U
74	0604113A	Future Tactical Unmanned Aircraft System (FTUAS)	04	59,183	76,349	95,719	U
75	0604114A	Lower Tier Air Missile Defense (LTAMD) Sensor	04	308,805	297,629	382,147	U
76	0604115A	Technology Maturation Initiatives	04	141,109	132,561	269,756	U
77	0604117A	Maneuver - Short Range Air Defense (M-SHORAD)	04	5,776	39,376	225,147	U
78	0604119A	Army Advanced Component Development & Prototyping	04	167,990	189,483	198,111	U
79	0604120A	Assured Positioning, Navigation and Timing (PNT)	04	115,688	83,952	43,797	U
80	0604121A	Synthetic Training Environment Refinement & Prototyping	04	112,093	206,335	166,452	U
81	0604134A	Counter Improvised-Threat Demonstration, Prototype Development, and Testing	04	13,326	13,379	15,840	U
82	0604135A	Strategic Mid-Range Fires	04			404,291	U
83	0604182A	Hypersonics	04	841,666	315,131	173,168	U
84	0604403A	Future Interceptor	04		6,895	8,179	U
85	0604531A	Counter - Small Unmanned Aircraft Systems Advanced Development	04		19,148	35,110	U

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Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
86	0604541A	Unified Network Transport	04	39,192	35,172	36,966	U
87	0604644A	Mobile Medium Range Missile	04	88,100	286,445		U
88	0604785A	Integrated Base Defense (Budget Activity 4)	04	2,020	2,040		U
89	0305251A	Cyberspace Operations Forces and Force Support	04	50,525	55,895	55,677	U
		Advanced Component Development & Prototypes		**3,589,313**	**3,818,276**	**4,098,749**	
90	0604201A	Aircraft Avionics	05	7,011	6,654	3,335	U
91	0604270A	Electronic Warfare Development	05	56,624	30,840	4,243	U
92	0604601A	Infantry Support Weapons	05	89,497	79,339	66,529	U
93	0604604A	Medium Tactical Vehicles	05	8,213	9,524	22,163	U
94	0604611A	JAVELIN	05	5,983	7,094	7,870	U
95	0604622A	Family of Heavy Tactical Vehicles	05	22,254	28,445	50,924	U
96	0604633A	Air Traffic Control	05	3,383	4,405	2,623	U
97	0604641A	Tactical Unmanned Ground Vehicle (TUGV)	05			115,986	U
98	0604642A	Light Tactical Wheeled Vehicles	05	4,371	2,055		U
99	0604645A	Armored Systems Modernization (ASM) - Eng Dev	05	123,992	122,778	71,287	U
100	0604710A	Night Vision Systems - Eng Dev	05	52,959	43,417	62,679	U
101	0604713A	Combat Feeding, Clothing, and Equipment	05	2,734	1,658	1,566	U
102	0604715A	Non-System Training Devices - Eng Dev	05	27,013	26,514	18,600	U
103	0604741A	Air Defense Command, Control and Intelligence - Eng Dev	05	62,058	59,518	39,541	U
104	0604742A	Constructive Simulation Systems Development	05	9,779	22,240	29,570	U
105	0604746A	Automatic Test Equipment Development	05	5,375	8,807	5,178	U
106	0604760A	Distributive Interactive Simulations (DIS) - Eng Dev	05	7,605	12,453	8,189	U

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
107	0604768A	Brilliant Anti-Armor Submunition (BAT)	05	20,175			U
108	0604780A	Combined Arms Tactical Trainer (CATT) Core	05	3,438			U
109	0604798A	Brigade Analysis, Integration and Evaluation	05	18,737	21,423	21,228	U
110	0604802A	Weapons and Munitions - Eng Dev	05	277,344	297,086	263,778	U
111	0604804A	Logistics and Engineer Equipment - Eng Dev	05	53,676	54,642	41,669	U
112	0604805A	Command, Control, Communications Systems - Eng Dev	05	10,674	20,107	40,038	U
113	0604807A	Medical Materiel/Medical Biological Defense Equipment - Eng Dev	05	48,285	44,400	5,513	U
114	0604808A	Landmine Warfare/Barrier - Eng Dev	05	9,239	29,137	12,150	U
115	0604818A	Army Tactical Command & Control Hardware & Software	05	126,676	155,017	111,690	U
116	0604820A	Radar Development	05	105,271	122,607	71,259	U
117	0604822A	General Fund Enterprise Business System (GFEBS)	05	15,428	15,979	10,402	U
118	0604823A	Firefinder	05	18,278			U
119	0604827A	Soldier Systems - Warrior Dem/Val	05	6,546	6,454	11,425	U
120	0604852A	Suite of Survivability Enhancement Systems - EMD	05	62,012	96,132	109,702	U
121	0604854A	Artillery Systems - EMD	05	36,187	25,000	23,106	U
122	0605013A	Information Technology Development	05	123,659	129,380	124,475	U
123	0605018A	Integrated Personnel and Pay System-Army (IPPS-A)	05	111,078	67,701	67,564	U
124	0605028A	Armored Multi-Purpose Vehicle (AMPV)	05	76,140	35,560		U
125	0605030A	Joint Tactical Network Center (JTNC)	05	15,671	16,350	17,950	U
126	0605031A	Joint Tactical Network (JTN)	05	30,540	28,905	30,169	U
127	0605033A	Ground-Based Operational Surveillance System - Expeditionary (GBOSS-E)	05	5,758			U
128	0605035A	Common Infrared Countermeasures (CIRCM)	05	29,770	16,630	11,523	U

Department of the Army
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Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
129	0605038A	Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Sensor Suite	05	4,669	7,618		U
130	0605041A	Defensive CYBER Tool Development	05	28,544	18,811	33,029	U
131	0605042A	Tactical Network Radio Systems (Low-Tier)	05	20,511	28,741	4,497	U
132	0605047A	Contract Writing System	05	22,025	20,960	23,487	U
133	0605051A	Aircraft Survivability Development	05	99,403	61,768	19,123	U
134	0605052A	Indirect Fire Protection Capability Inc 2 - Block 1	05	152,399	182,257	131,093	U
135	0605053A	Ground Robotics	05	12,010	16,360	26,809	U
136	0605054A	Emerging Technology Initiatives	05	294,366	226,802	185,311	U
137	0605143A	Biometrics Enabling Capability (BEC)	05		4,326	11,091	U
138	0605144A	Next Generation Load Device - Medium	05		15,397	22,439	U
139	0605145A	Medical Products and Support Systems Development	05	919	962		U
140	0605148A	Tactical Intel Targeting Access Node (TITAN) EMD	05		54,972	58,087	U
141	0605203A	Army System Development & Demonstration	05	177,501	122,175	119,516	U
142	0605205A	Small Unmanned Aerial Vehicle (SUAV) (6.5)	05	5,780	2,275	6,530	U
143	0605224A	Multi-Domain Intelligence	05		9,313	19,911	U
144	0605225A	SIO Capability Development	05		22,713		U
145	0605231A	Precision Strike Missile (PrSM)	05		188,452	259,506	U
146	0605232A	Hypersonics EMD	05		111,473	633,499	U
147	0605233A	Accessions Information Environment (AIE)	05		16,790	13,647	U
148	0605235A	Strategic Mid-Range Capability	05			5,016	U
149	0605236A	Integrated Tactical Communications	05			12,447	U
150	0605450A	Joint Air-to-Ground Missile (JAGM)	05	7,566	2,134	2,366	U

Department of the Army
FY 2023 President's Budget
Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Apr 2022

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
151	0605457A	Army Integrated Air and Missile Defense (AIAMD)	05	213,956	159,873	265,288	U
152	0605531A	Counter - Small Unmanned Aircraft Systems Sys Dev & Demonstration	05		33,386	14,892	U
153	0605625A	Manned Ground Vehicle	05	162,390	202,320	589,762	U
154	0605766A	National Capabilities Integration (MIP)	05	7,670	13,454	17,030	U
155	0605812A	Joint Light Tactical Vehicle (JLTV) Engineering and Manufacturing Development Ph	05	1,500	2,564	9,376	U
156	0605830A	Aviation Ground Support Equipment	05	1,413	1,201	2,959	U
157	0303032A	TROJAN - RH12	05	3,451	3,362	3,761	U
158	0303667A	Citizen Broadband Radio System	05	900			U
159	0303767A	AMBIT - Pre-Auctioned SRF	05	9,785			U
160	0304270A	Electronic Warfare Development	05	59,755	75,520	56,938	U
	System Development & Demonstration			**2,979,946**	**3,254,230**	**4,031,334**	
161	0604256A	Threat Simulator Development	06	41,487	61,422	18,437	U
162	0604258A	Target Systems Development	06	35,279	42,404	19,132	U
163	0604759A	Major T&E Investment	06	119,231	93,617	107,706	U
164	0605103A	Rand Arroyo Center	06	12,989	32,296	35,542	U
165	0605301A	Army Kwajalein Atoll	06	221,949	240,877	309,005	U
166	0605326A	Concepts Experimentation Program	06	46,847	79,585	87,122	U
167	0605502A	Small Business Innovative Research	06	369,715			U
168	0605601A	Army Test Ranges and Facilities	06	390,366	367,125	401,643	U
169	0605602A	Army Technical Test Instrumentation and Targets	06	81,829	59,253	37,962	U
170	0605604A	Survivability/Lethality Analysis	06	36,001	36,370	36,500	U
171	0605606A	Aircraft Certification	06	2,736	2,489	2,777	U

Department of the Army
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Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
172	0605702A	Meteorological Support to RDT&E Activities	06	6,360	6,521	6,958	U
173	0605706A	Materiel Systems Analysis	06	21,830	21,558	22,037	U
174	0605709A	Exploitation of Foreign Items	06	8,936	13,631	6,186	U
175	0605712A	Support of Operational Testing	06	54,116	55,122	70,718	U
176	0605716A	Army Evaluation Center	06	56,827	65,854	67,058	U
177	0605718A	Army Modeling & Sim X-Cmd Collaboration & Integ	06	2,478	2,633	6,097	U
178	0605801A	Programwide Activities	06	89,023	96,558	89,793	U
179	0605803A	Technical Information Activities	06	25,817	31,987	28,752	U
180	0605805A	Munitions Standardization, Effectiveness and Safety	06	50,648	63,042	48,316	U
181	0605857A	Environmental Quality Technology Mgmt Support	06	1,715	1,789	1,912	U
182	0605898A	Army Direct Report Headquarters - R&D - MHA	06	50,859	48,981	53,271	U
183	0606002A	Ronald Reagan Ballistic Missile Defense Test Site	06	74,089	80,921	90,088	U
184	0606003A	CounterIntel and Human Intel Modernization	06	5,200	5,363	1,424	U
185	0606105A	Medical Program-Wide Activities	06	18,973	39,041		U
186	0606942A	Assessments and Evaluations Cyber Vulnerabilities	06	6,496	5,466	5,816	U
187	0909999A	Financing for Cancelled Account Adjustments	06	253			U
		Management Support		**1,832,049**	**1,553,905**	**1,554,252**	
188	0603778A	MLRS Product Improvement Program	07	9,785	12,314	18,463	U
189	0605024A	Anti-Tamper Technology Support	07	8,436	8,868	9,284	U
190	0607131A	Weapons and Munitions Product Improvement Programs	07	24,666	35,828	11,674	U
191	0607134A	Long Range Precision Fires (LRPF)	07	100,146			U
192	0607136A	Blackhawk Product Improvement Program	07	8,300	14,773		U

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Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
193	0607137A	Chinook Product Improvement Program	07	49,409	67,872	52,513	U
194	0607139A	Improved Turbine Engine Program	07	232,159	260,024	228,036	U
195	0607142A	Aviation Rocket System Product Improvement and Development	07	11,321	12,417	11,312	U
196	0607143A	Unmanned Aircraft System Universal Products	07	19,460	4,594	512	U
197	0607145A	Apache Future Development	07	52,502	10,067	10,074	U
198	0607148A	AN/TPQ-53 Counterfire Target Acquisition Radar System	07		47,752	62,559	U
199	0607150A	Intel Cyber Development	07	14,652	3,611	13,343	U
200	0607312A	Army Operational Systems Development	07	35,851	28,029	26,131	U
201	0607313A	Electronic Warfare Development	07		5,673	6,432	U
202	0607665A	Family of Biometrics	07	1,276	1,144	1,114	U
203	0607865A	Patriot Product Improvement	07	178,984	125,932	152,312	U
204	0203728A	Joint Automated Deep Operation Coordination System (JADOCS)	07	43,060	25,489	19,329	U
205	0203735A	Combat Vehicle Improvement Programs	07	213,726	280,107	192,310	U
206	0203743A	155mm Self-Propelled Howitzer Improvements	07	217,959	175,076	136,680	U
207	0203744A	Aircraft Modifications/Product Improvement Programs	07	11,261	10,000		U
208	0203752A	Aircraft Engine Component Improvement Program	07	80	132	148	U
209	0203758A	Digitization	07	4,351	3,903	2,100	U
210	0203801A	Missile/Air Defense Product Improvement Program	07	1,241	127	3,109	U
211	0203802A	Other Missile Product Improvement Programs	07	15,268	10,265	9,027	U
212	0205412A	Environmental Quality Technology - Operational System Dev	07	250	262	793	U
213	0205778A	Guided Multiple-Launch Rocket System (GMLRS)	07	72,817	60,733	20,180	U
214	0208053A	Joint Tactical Ground System	07	9,510	13,379	8,813	U

Department of the Army
FY 2023 President's Budget
Exhibit R-1 FY 2023 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Apr 2022

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

Line No	Program Element Number	Item	Act	FY 2021 (Base + OCO)	FY 2022 Enactment	FY 2023 Request	Sec
216	0303028A	Security and Intelligence Activities	07	23,367	24,531		U
217	0303140A	Information Systems Security Program	07	28,270	15,680	17,209	U
218	0303141A	Global Combat Support System	07	70,652	45,297	27,100	U
219	0303142A	SATCOM Ground Environment (SPACE)	07	18,002	15,222	18,321	U
222	0305179A	Integrated Broadcast Service (IBS)	07	382	5,430	9,926	U
223	0305204A	Tactical Unmanned Aerial Vehicles	07	38,151	8,410	4,500	U
224	0305206A	Airborne Reconnaissance Systems	07	28,858	24,460	17,165	U
225	0305208A	Distributed Common Ground/Surface Systems	07	40,771			U
226	0307665A	Biometrics Enabled Intelligence	07		2,066		U
227	0708045A	End Item Industrial Preparedness Activities	07	130,785	103,720	91,270	U
9999	9999999999	Classified Programs		3,983	2,993	6,664	U
		Operational Systems Development		**1,719,691**	**1,466,180**	**1,188,403**	
228	0608041A	Defensive CYBER - Software Prototype Development	08	56,706	108,841	94,888	U
		Software and Digital Technology Pilot Programs		**56,706**	**108,841**	**94,888**	
Total Research, Development, Test & Eval, Army				**14,197,238**	**14,528,259**	**13,710,273**	

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

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

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604768A *I Brilliant Anti-Armor Submunition (BAT)*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	20.175	-	-	-	-	0.000	0.000	0.000	0.000	0.000	20.175
688: *ATACMS BLK II*	-	20.175	-	-	-	-	-	-	-	-	0.000	20.175

A. Mission Description and Budget Item Justification

This program element was for Army Tactical Missile System Block II (ATACMS BLK II) missile system Brilliant Anti-Armor (BAT) submunition. In FY18, it was repurposed for BREAKER and in FY19, CD ATACMS was added. BREAKER ended in FY19 and CD ATACMS was moved to a different program element. In FY20 and beyond, this program element funds only PFAL (Palletized Field Artillery Launcher).

Project P01. Multi-Mode Seeker began integration of Strategic Capabilities Office (SCO) STRIKE-X program demonstrated capabilities into ATACMS. This effort focused on providing integration of a seeker to search, detect, acquire, and engage moving maritime/land-based targets. There is no funding in FY2021.

Project 688 is a developmental effort for the Palletized Field Artillery Launcher (PFAL). Previously, PFAL was STRIKE-X capability 1 of the SCO Demonstration program and CD ATACMS was STRIKE X capability 3. PFAL is a palletized erectable launcher that provides alternatives to deliver near-term innovative long-range strike capabilities to improve operational effectiveness for Combatant Commanders. The PFAL launcher consists of an erectable palletized mechanical structure, Fire Control System (FCS), and Power Management System (PMS). PFAL is capable of firing all current Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM) rockets and missiles, to include the Guided Multiple Launch Rocket System (GMLRS), the Army Tactical Missile System (ATACMS), and future munitions such as the Precision Strike Missile (PrSM) and Extended Range GMLRS (ER GMLRS). PFAL is capable of carrying two launch pods each containing either six GMLRS / MLRS rockets or one ATACMS missile. The PFAL launcher is capable of firing from a fixed ground position, Palletized Load System (PLS) trailer, or maritime vessel.

Justification:
There is no FY23 funding.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army					Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*		R-1 Program Element (Number/Name) PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*			
B. Program Change Summary ($ in Millions)	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**
Previous President's Budget	24.064	0.000	0.000	-	0.000
Current President's Budget	20.175	0.000	0.000	-	0.000
Total Adjustments	-3.889	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.889	-			
• SBIR/STTR Transfer	-	-			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*	Project (Number/Name) 688 / *ATACMS BLK II*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
688: *ATACMS BLK II*	-	20.175	-	-	-	-	-	-	-	-	0.000	20.175
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element was for Army Tactical Missile System Block II (ATACMS BLK II) missile system Brilliant Anti-Armor (BAT) submunition. In FY18, it was repurposed for BREAKER and in FY19, CD ATACMS was added. BREAKER ended in FY19 and CD ATACMS was moved to a different program element. In FY20 and beyond, this program element funds only PFAL (Palletized Field Artillery Launcher).

Project P01. Multi-Mode Seeker began integration of Strategic Capabilities Office (SCO) STRIKE-X program demonstrated capabilities into ATACMS. This effort focused on providing integration of a seeker to search, detect, acquire, and engage moving maritime/land-based targets. There is no funding in FY2021.

Project 688 is a developmental effort for the Palletized Field Artillery Launcher (PFAL). Previously, PFAL was STRIKE-X capability 1 of the SCO Demonstration program and CD ATACMS was STRIKE X capability 3. PFAL is a palletized erectable launcher that provides alternatives to deliver near-term innovative long-range strike capabilities to improve operational effectiveness for Combatant Commanders. The PFAL launcher consists of an erectable palletized mechanical structure, Fire Control System (FCS), and Power Management System (PMS). PFAL is capable of firing all current Multiple Launch Rocket System (MLRS) Family of Munitions (MFOM) rockets and missiles, to include the Guided Multiple Launch Rocket System (GMLRS), the Army Tactical Missile System (ATACMS), and future munitions such as the Precision Strike Missile (PrSM) and Extended Range GMLRS (ER GMLRS). PFAL is capable of carrying two launch pods each containing either six GMLRS / MLRS rockets or one ATACMS missile. The PFAL launcher is capable of firing from a fixed ground position, Palletized Load System (PLS) trailer, or maritime vessel.

In FY2020 and FY2021, the Army will procure the kits to build 1 prototype to replace the 3 SCO prototypes that were dispositioned to an Army unit in FY2020. In FY2021, the Army will design and develop upgrades to the baseline design based upon the directed requirement.

There is no FY23 funding request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Palletized Field Artillery Launcher (PFAL)	20.175	-	-
Description: The Palletized Field Artillery Launcher (PFAL) Program provides a palletized erectable launcher capable of firing the Multiple Launched Rocket System (MLRS) Family of Munitions (MFOM). This effort will refine prototypes against Combatant Commanders specific requirements to support a continuous user evaluation.			
Accomplishments/Planned Programs Subtotals	20.175	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*	**Project (Number/Name)** 688 / *ATACMS BLK II*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Palletized Field Artillery Launcher (PFAL) transitions from a Strategic Capabilities Office (SCO) managed effort to management by the Precision Fires Rocket and Missile Systems Project Office. The PFAL program performs development efforts required to refine prototypes against Combatant Commander's specific requirements to support a user evaluation. The PFAL program will conduct analysis and implement design improvements to demonstrate safe and effective design to enable deployment of prototypes as part of a continuous user evaluation.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*	Project (Number/Name) 688 / *ATACMS BLK II*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Program Management	MIPR	Various : RSA	1.688	0.872	Nov 2020	-		-		-		-	0.000	2.560	-
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	0.908	-		-		-		-		-	0.000	0.908	-
		Subtotal	2.596	0.872		-		-		-		-	0.000	3.468	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	0.159	-		-		-		-		-	0.000	0.159	-
BREAKER Warhead Development	C/CPFF	LMMFC : Dallas, TX	2.300	-		-		-		-		-	0.000	2.300	-
BREAKER System Analysis, Requirement & Spec Dev	MIPR	AMRDEC : Redstone Arsenal, AL	1.477	-		-		-		-		-	0.000	1.477	-
PFAL Development Engineering	MIPR	CCDC AvMC : Redstone Arsenal	18.269	7.738	Dec 2020	-		-		-		-	0.000	26.007	-
PFAL Prototype Development	C/CPIF	AMTC : Redstone Arsenal, AL	-	0.010	Dec 2020	-		-		-		-	0.000	0.010	-
Prototype Fabrication	TBD	TBD : TBD	-	10.009	Dec 2020	-		-		-		-	0.000	10.009	-
		Subtotal	22.205	17.757		-		-		-		-	0.000	39.962	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Quality, Safety, Systems Engineering, and Analysis	TBD	Various : Redstone Arsenal, AL	-	0.457	Dec 2020	-		-		-		-	0.000	0.457	-
		Subtotal	-	0.457		-		-		-		-	0.000	0.457	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*	Project (Number/Name) 688 / *ATACMS BLK II*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support	MIPR	Various : Various	-	1.089	Dec 2020	-		-		-		-	0.000	1.089	-
		Subtotal	-	1.089		-		-		-		-	0.000	1.089	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	24.801	20.175		-		-		-		-	0.000	44.976	N/A

Remarks

Acronyms:
AvMC: Aviation and Missile Center;
AMTC: Aviation & Missile Technology Consortium;
CCDC: Combat Capabilities Development Command;
AMRDEC: Aviation and Missile Research, Development and Engineering Command;
LMMFC: Lockheed Martin Missiles and Fire Control;
RSA: Redstone Arsenal, Alabama;
CD: Cross Domain
STORM - Strategic and Operational Rockets and Missiles

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*	**Project (Number/Name)** 688 / *ATACMS BLK II*

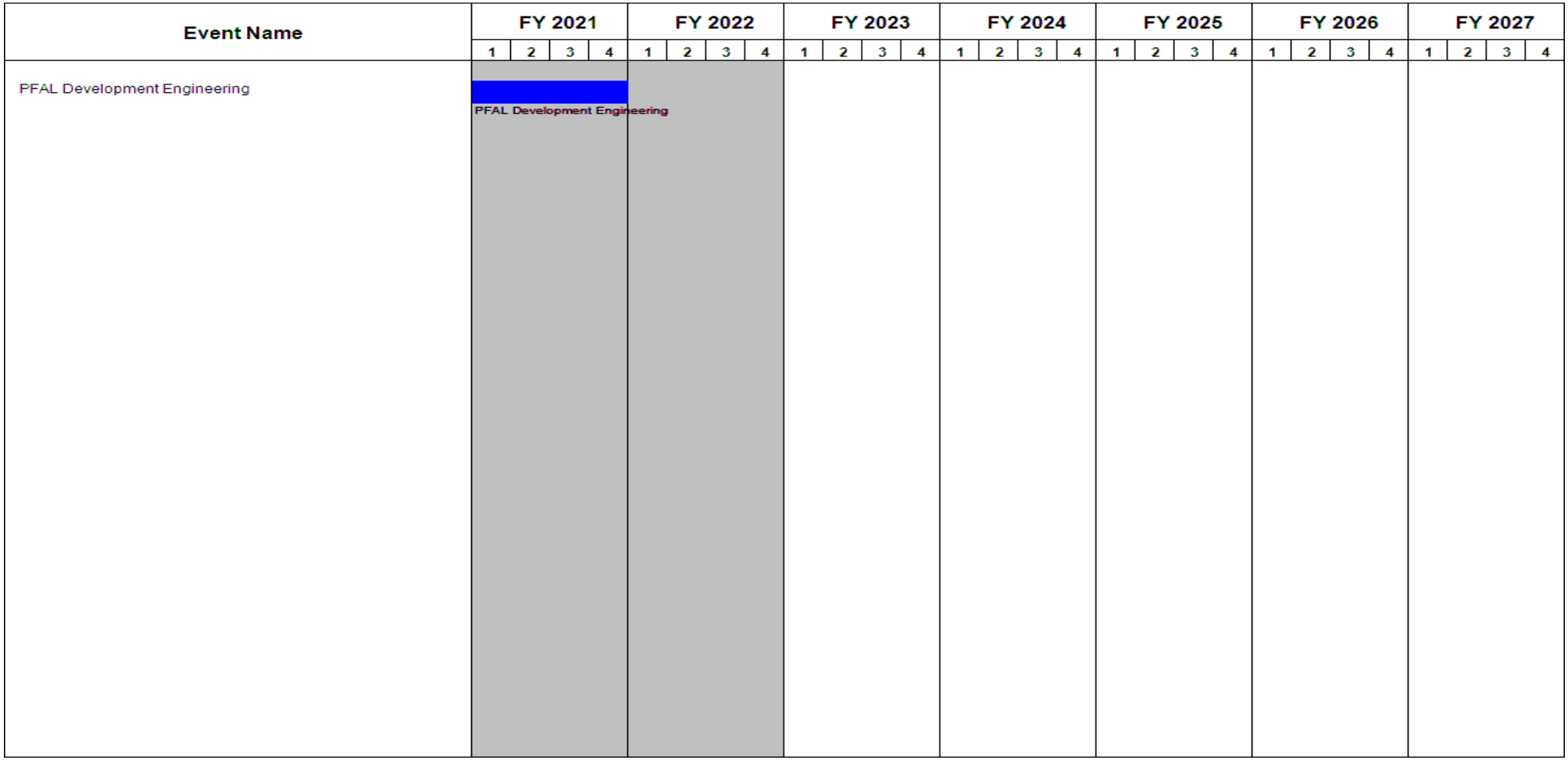


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604768A / *Brilliant Anti-Armor Submunition (BAT)*	**Project (Number/Name)** 688 / *ATACMS BLK II*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
System Analysis, Requirement & Spec Development	1	2018	4	2019
Warhead Development	1	2019	4	2019
Contract Requirements Package Development	1	2018	4	2019
PFAL Development Engineering	1	2020	4	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604780A *I Combined Arms Tactical Trainer (CATT) Core*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	3.438	-	-	-	-	0.000	0.000	0.000	0.000	Continuing	Continuing
582: *Synthetic Envir Core*	-	3.438	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2023.

A. Mission Description and Budget Item Justification

The Combined Arms Tactical Trainers (CATT) represent a family of combined arms simulation systems designed to support the Army's simulation-based, Combined Arms Training Strategy. The CATT program portfolio directly supports the Army's Training Strategy and progressive training model by providing realistic training events and comprehensive After Action Reviews (AAR). CATT enables units, from crew to the battalion task force level, to conduct a wide variety of combat tasks on a realistic, interactive, synthetic battlefield. CATT's combination of manned simulators and staff officer workstations enables units to train as a combined arms team in a cost effective manner. The primary CATT system is the Close Combat Tactical Trainer (CCTT) which provides the underlying baseline architecture and AAR for CATT expansions, Pre-Planned Product Improvements (P3I) and system enhancements. The Reconfigurable Vehicle Simulator (RVS) supports combat convoy operations and Improvised Explosive Devices (IED) tasks. Synthetic Environment (SE) Core provides for the expansion of the synthetic environment baseline to include enhanced interoperability and the products and infrastructure to support current and future combat operations and mission rehearsal. The first synthetic environments expanded were in the Aviation Combined Arms Tactical Trainer (AVCATT) and the CCTT for both the Active and Reserve components. Gaming Technology provides an application to train and rehearse convoy-operations, platoon level, mounted infantry tactics, dismounted operations, rules-of-engagement training, cross-cultural communications training, IED defeat training, route clearance, ground-air coordination, Unmanned Aerial Vehicle (UAV) integration, and other small unit and individual training and mission rehearsal requirements. Soldiers can train in a common environment on geotypical or geospecific virtual terrain. It is also possible to link Gaming technology to actual communication, command, control, computer, and intelligence (C4I) systems and other CATT simulation systems to increase the utility and realism of the training. By practicing skills in CATT, units are able to effectively prepare for costly live fire and maneuver exercises, as well as training tasks deemed too hazardous to conduct in a live training environment. Fielded in both fixed site and mobile versions, CATT enables both Active and Reserve component units to prepare for real world contingency missions. By being able to use a wide array of training terrain databases and modify the behavior of the computer generated opposing forces, CATT offers an unlimited array of training options to support the Army's many regional combat missions. The combination of tough field and live fire training, and realistic simulation training in CATT, is the formula to prepare Soldiers and their Leaders for the uncertainties they face in combat operations.

Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604780A *I Combined Arms Tactical Trainer (CATT) Core*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	3.438	0.000	0.000	-	0.000
Current President's Budget	3.438	0.000	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604780A / *Combined Arms Tactical Trainer (CATT) Core*	Project (Number/Name) 582 / *Synthetic Envir Core*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
582: *Synthetic Envir Core*	-	3.438	-	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2023.

A. Mission Description and Budget Item Justification

This project supports the Synthetic Environment Core (SE Core) Program. The SE Core Program is a foundational element and the only provider of correlated terrain for the Army's Live, Virtual, Constructive Integrated Training Environment (LVC ITE) that links Army training systems and simulators into an integrated and interoperable environment. SE Core's mission is to ensure that Army systems and simulators support U.S. Army Readiness by providing visual models (buildings and vehicles), terrain (over which the simulator moves), and entity behaviors (models performing realistic and appropriate actions such as movement and weapon effects) that are relevant and realistic in support of Multi-Domain Operations (MDO) 2028. As the exclusive provider of correlated terrain, SE Core ensures that all Army simulators/ operators receive terrain that allows for a "Fair Fight" capability; that is, no one will have an inherent advantage over another because training did not occur on a "level playing field". Fair Fight allows air and ground forces to hold coordinated and integrated training events that accurately replicate combat operations for a train-as-we-fight capability.

A major component of the program is the SE Core-developed Standard Terrain Database Generation Capability (STDGC), the process used to build the terrain and models that the simulators and simulations employ. The Army Geospatial Center (AGC) gave SE Core its highest rating, the "Gold Standard", based on the quality of the STDGC process and the geospatial data generated by it. The program has been a certified, AGC co-producer of geospatial data since 2014. In addition to the correlated terrain databases and common visual models, SE Core components include Virtual One Semi-Automated Forces (Virtual OneSAF) (the computer generated force behaviors for virtual systems); the virtual systems architecture; and mission command development.

Project 582 - Synthetic Environment Core, has completed and the program will not request funding in FY 2023.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Engineering and Manufacturing Development (EMD) phase contract activity for the Synthetic Environment Core (SE Core) program. ***Description:*** Continue EMD phase contract activities for the SE Core program.	3.079	-	-
Title: Government Program Management for the Synthetic Environment Core (SE Core) program. ***Description:*** Government Program Management for the SE Core program.	0.359	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604780A / *Combined Arms Tactical Trainer (CATT) Core*	**Project (Number/Name)** 582 / *Synthetic Envir Core*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Accomplishments/Planned Programs Subtotals	3.438	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The SE Core program is post Milestone B and will remain in the Engineering and Manufacturing Development phase for the remainder of its lifecycle. SE Core is a "software only" program that continuously develops terrain, virtual models and other software products for integration into existing training systems. It does not field products to the end user, therefore the program will not require a Milestone C decision or go into the Production phase. The SE Core program is developing the software tools and processes to develop the Army's common virtual environment to link simulation devices [to include: Close Combat Tactical Trainer (CCTT), Aviation Close Combat tactical Trainer (AVCATT) , Games for Training (GFT), Live, Virtual, Constructive Integrating Architecture (LVC-IA), Homestation Instrumentation Training System (HITS), Joint Land Component Constructive Training Capability (JLCCTC), Fires Simulation (FIRESIM), One Semi-Automated Forces (OneSAF)] into an interoperable environment and maintaining the synthetic terrain, models, and virtual OneSAF for the Army's Integrated Training Environment (ITE) concept.

The government awarded Increment 2 as a single award, cost plus fixed fee (CPFF), indefinite delivery indefinite quantity (IDIQ) contract to Leidos in August 2011 with a period of performance start date of December 2011. Leidos was formerly known as Science Applications International Corporation (SAIC). This contract has a one-year base with four one-year options. The government exercised the first option in December 2012, the second option in December 2013, the third option in December 2014 and the fourth option in December 2015. The government awarded a final delivery order in December 2016 that extended the period of performance of the Increment 2 contract into December 2017. The contract was extended an additional six months to June 2018 while the Increment 3 contract was competed.

In April 2018, in keeping with the original SE Core acquisition strategy of continuous development, the government awarded the Increment 3 contract as a single award, CPFF, IDIQ with a one year base and four one-year options and a target end date of FY 2023.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604780A / *Combined Arms Tactical Trainer (CATT) Core*	Project (Number/Name) 582 / *Synthetic Envir Core*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	Various	Various : Various	3.622	-		-		-		-		-	0.000	3.622	3.622
Government Program Management Support	Various	PEO STRI : Orlando, FL	26.726	0.359	Feb 2021	-		-		-		-	Continuing	Continuing	Continuing
FY 2020 SBIR/STTR Transfer	TBD	Various : Various	0.419	-		-		-		-		-	0.000	0.419	-
		Subtotal	30.767	0.359		-		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Development - Architecture and Integration	C/CPFF	SAIC : Orlando, FL	6.946	-		-		-		-		-	0.000	6.946	6.946
Technology Development -Architecture and Integration	C/CPFF	SAIC : Orlando, FL	50.785	-		-		-		-		-	0.000	50.785	50.785
Technology Development -Database Virtual Environment Development	C/CPFF	CAE, USA : Orlando, FL	56.179	-		-		-		-		-	0.000	56.179	56.179
Technology Development-Common Virtual Environment & Management	C/Various	Leidos : Orlando, FL	80.284	-		-		-		-		-	0.000	80.284	80.284
Technology Development-Common Virtual Environment & Management INC III	C/Various	Leidos, Inc. : Orlando, FL	10.525	-		-		-		-		-	0.000	10.525	Continuing
Technology Development-Common Virtual Environment & Management INC III	Option/ Various	Leidos : Orlando, FL	13.178	3.079	Nov 2020	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	217.897	3.079		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604780A / *Combined Arms Tactical Trainer (CATT) Core*	Project (Number/Name) 582 / *Synthetic Envir Core*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

FY 2020 award in Nov 2019 of $8.238 million funds remaining option year 1 period and awards option year 2 period. FY 2021 award of $3.079 million in Nov 2020 fully funds option year 2 period and awards option year 3 period.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Development - Test Support	Various	Test Community : Various	0.125	-		-		-		-		-	0.000	0.125	0.125
		Subtotal	0.125	-		-		-		-		-	0.000	0.125	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	248.789	3.438		-		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604780A / *Combined Arms Tactical Trainer (CATT) Core*	**Project (Number/Name)** 582 / *Synthetic Envir Core*

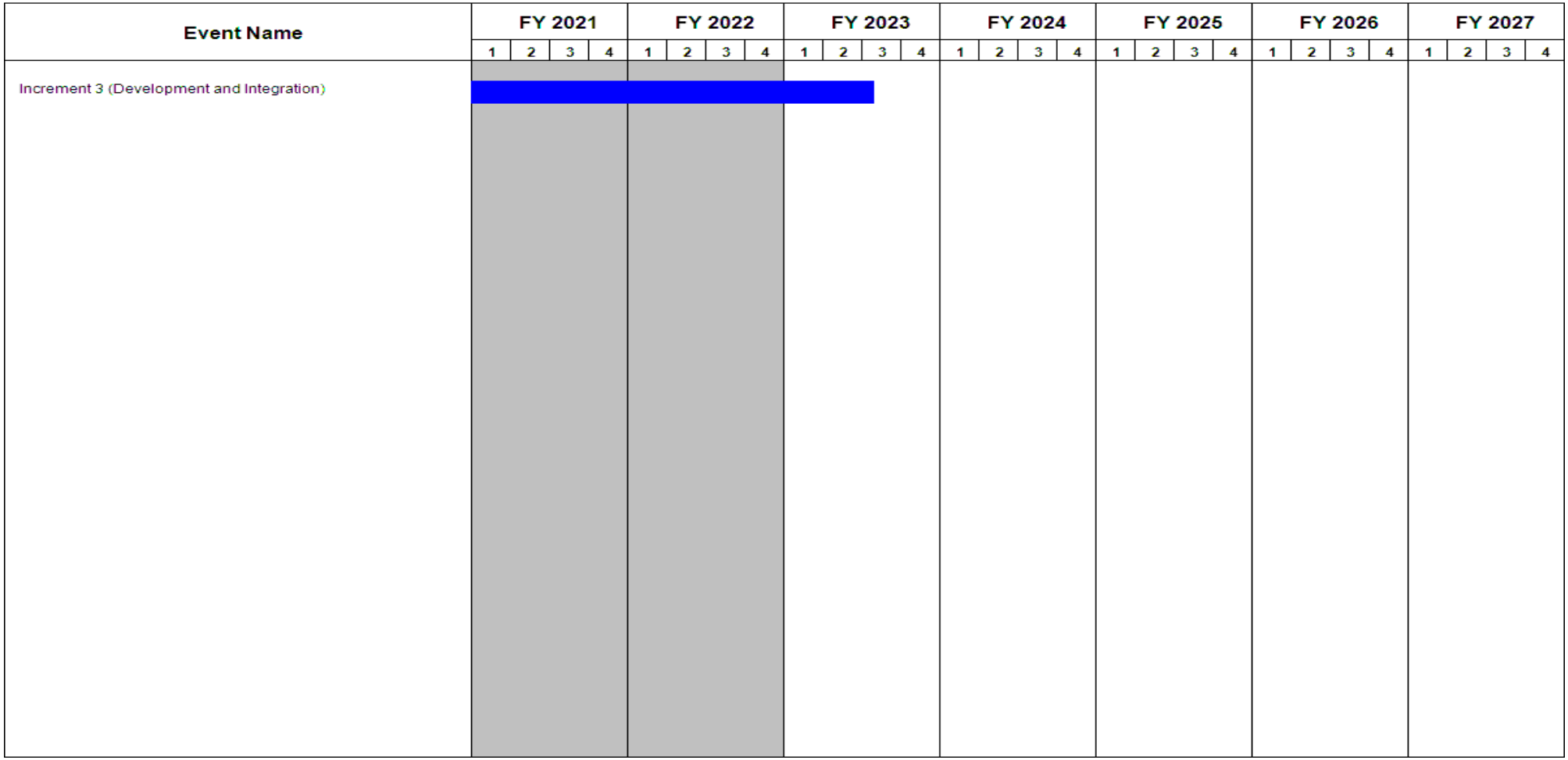


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604780A / *Combined Arms Tactical Trainer (CATT) Core*	**Project (Number/Name)** 582 / *Synthetic Envir Core*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Increment 2 (Development and Integration)	4	2013	3	2018
Increment 3 (Development and Integration)	3	2018	3	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604798A *I Brigade Analysis, Integration and Evaluation*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	18.737	21.423	21.228	-	21.228	21.464	21.495	21.157	21.272	0.000	146.776
DY5: *Production/Field Coordination for Capability Sets*	-	1.035	-	-	-	-	-	-	-	-	0.000	1.035
DY7: *Army Systems Engineering, Architecture & Analysis*	-	17.702	21.423	21.228	-	21.228	21.464	21.495	21.157	21.272	0.000	145.741

A. Mission Description and Budget Item Justification

This program element is comprised of four projects: Production/Field Coordination for Capability Sets; Army Systems Engineering, Architecture & Analysis; Army Integration Management & Coordination; and Emerging Technology Initiatives. The specific evaluation requirements will support Mission Command Network (MCN) 2020, the Force 2025 objectives, and emerging technology insertion.

Project DY5: Production/Fielding Coordination for Capability Sets, provides for the development of a synchronized Brigade/Division level plan for the Production equipment delivery and Fielding (hand-off logistics and new equipment training) of Capability Set (CS) components (both hardware/software in A and/or B Kits) upon completion of Network Integration Evaluation (NIE), Army Interoperability Certification (AIC) and Army CS fielding decision. The remaining funding is tied to OCSE core manpower authorizations which are realigned to Project DY7 in FY 2022 and beyond.

Project DY7: Provides the Army's leadership and materiel developers with the necessary modernization planning, System of Systems (SoS) engineering and analysis, technical risk analysis, architectural products, critical path analysis, cybersecurity and interoperability risk analysis and the associated mitigation planning for the Army's materiel portfolio. This project develops process, products, and policies that ensure a solid Army Systems Engineering construct across Army Program Executive and Management Offices. This includes efforts in support of Common Operating Environment (COE) governance, the Army Futures Command's emerging development of concepts, requirements generation, resource allocation, experimentation, acquisition, logistics, and technology components of the Army Future Force Modernization Enterprise (FFME). Focus areas includes the integration of key elements of a system into one overall system engineering construct and managing it through major system engineering activities to ensure the fielding of integrated capabilities meet the mission needs of the force against any potential adversaries. Key system engineering functions include, engineering and technical analysis, integrated System of Systems (SoS) architecture products, SoS risk analysis and mitigation planning to influence the Army's materiel portfolio. This project also includes the establishment of Army systems engineering policy and implementation standards, requirements decomposition and alignment, and resource and acquisition synchronization to address cross-portfolio issues. Key tasks are the development of integrated Architecture products; Engineering Analysis and Design; Portfolio Analysis; Systems Security Engineering process, interoperability assessments, independent technical risk assessments, Cybersecurity requirements analysis, compliance, Cyber policy assessments, and coordinates the ASA(ALT) community's Data activities including Data Steward and Functional Data Manager in Army Data Governance Forums.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army					Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0604798A *I Brigade Analysis, Integration and Evaluation*		
B. Program Change Summary ($ in Millions)	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**
Previous President's Budget	18.737	21.534	0.000	-	0.000
Current President's Budget	18.737	21.423	21.228	-	21.228
Total Adjustments	0.000	-0.111	21.228	-	21.228
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	21.228	-	21.228
• FFRDC Transfer	-	-0.111	-	-	-

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604798A / *Brigade Analysis, Integration and Evaluation*	Project (Number/Name) DY5 / *Production/Field Coordination for Capability Sets*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
DY5: *Production/Field Coordination for Capability Sets*	-	1.035	-	-	-	-	-	-	-	-	0.000	1.035
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the development of a synchronized Brigade/Division level plan for the Production equipment delivery and Fielding (hand-off logistics and new equipment training) of Capability Set (CS) components (both hardware/software in A and/or B Kits) upon completion of design, Type Classification and Material Release, Army Interoperability Certification (AIC) and Army CS fielding decision. It provides for the synchronized plan for production equipment delivery and fielding for the Integrated Tactical Network and the Security Force Advisory Brigades.

This project includes the following efforts: Synchronization and direct coordination between participating Program Executive Offices (PEOs), Program Managers (PMs), Research, Development and Engineering Commands (RDECOMs) and the Army's Brigade Combat Teams (BCT) throughout the CS Vehicle Integration and Synchronized Fielding process to ensure that a CS package is received, integrated, trained, and handed-off to the unit in a synchronized and efficient manner. Identification and assessment of available capabilities for inclusion into a CS, ITN and SFAB network modernization package. Alignment of the CS, ITN and SFAB requirement with the appropriate Programs of Record (PoR) and the recipient unit to define the unit's Network Basis of Issue (NBOI)/ Architecture by type of BCT. Coordination with PEOs, PMs, Army G-staff to ensure CS products are Materiel Released/Type Classified, fully resourced and synchronized by a single Integrated Master Schedule for design integration, testing, production, kitting, platform integration, training and fielding. Direct support during each of the unit's "New Equipment Training" and "New Equipment Fielding", along with the preparation for the BCT's rotation through one of the Army's Combat Training Centers, (Joint Readiness Training Center (JRTC) or National Training Center (NTC)). Ensuring that all training assets are reset and moved to the follow-on BCT. Manage all After Action activities.

This project does not fund the actual production, integration, nor fielding costs associated with the CS, ITN nor SFAB.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Production/Fielding Coordination for Capability Sets (CS)	1.035	-	-
Description: This project provides for the development of a synchronized Brigade/Division level plan for the Production equipment delivery and Fielding (hand-off logistics and new equipment training) of Capability Set (CS) components (both hardware/software in A and/or B Kits) upon completion of design, Type Classification and Material Release, Army Interoperability Certification (AIC) and Army CS fielding decision. It provides for the synchronized plan for production equipment delivery and fielding for the Integrated Tactical Network and the Security Force Advisory Brigades. This project includes the following efforts: Synchronization and direct coordination between participating Program Executive Offices (PEOs), Program Managers (PMs), Research, Development and Engineering Commands (RDECOMs) and the Army's Brigade Combat Teams (BCT) throughout the CS Vehicle Integration and Synchronized Fielding process to ensure that a			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY5 / *Production/Field Coordination for Capability Sets*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
CS package is received, integrated, trained, and handed-off to the unit in a synchronized and efficient manner. Identification and assessment of available capabilities for inclusion into a CS, ITN and SFAB network modernization package. Alignment of the CS, ITN and SFAB requirement with the appropriate Programs of Record (PoR) and the recipient unit to define the unit's Network Basis of Issue (NBOI)/ Architecture by type of BCT. Coordination with PEOs, PMs, Army G-staff to ensure CS products are Materiel Released/Type Classified, fully resourced and synchronized by a single Integrated Master Schedule for design integration, testing, production, kitting, platform integration, training and fielding. Direct support during each of the unit's "New Equipment Training" and "New Equipment Fielding", along with the preparation for the BCT's rotation through one of the Army's Combat Training Centers, (Joint Readiness Training Center (JRTC) or National Training Center (NTC)). Ensuring that all training assets are reset and moved to the follow-on BCT. Manage all After Action activities. This project does not fund the actual production, integration, nor fielding costs associated with the CS, ITN nor SFAB.			
Accomplishments/Planned Programs Subtotals	1.035	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• DY7: *Army Systems Engineering, Architecture & Analysis*	17.702	21.423	21.228	-	21.228	21.464	21.495	21.157	21.272	Continuing	Continuing

Remarks

D. Acquisition Strategy

This project does not have any requirement for direct procurement of hardware or software.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604798A / *Brigade Analysis, Integration and Evaluation*	Project (Number/Name) DY5 / *Production/Field Coordination for Capability Sets*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Production/Fielding Coordination for Capability Sets	TBD	Various Note: 1 : TBD	21.735	1.035	Nov 2019	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	21.735	1.035		-		-		-		-	Continuing	Continuing	N/A

Remarks

Note: 1
- Program Activities performed at TACOM (Warren MI) and CS units location receiving fielding.
- Program Integration support through various PMs, PEOs, RDECOM.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	21.735	1.035		-		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY5 / *Production/Field Coordination for Capability Sets*

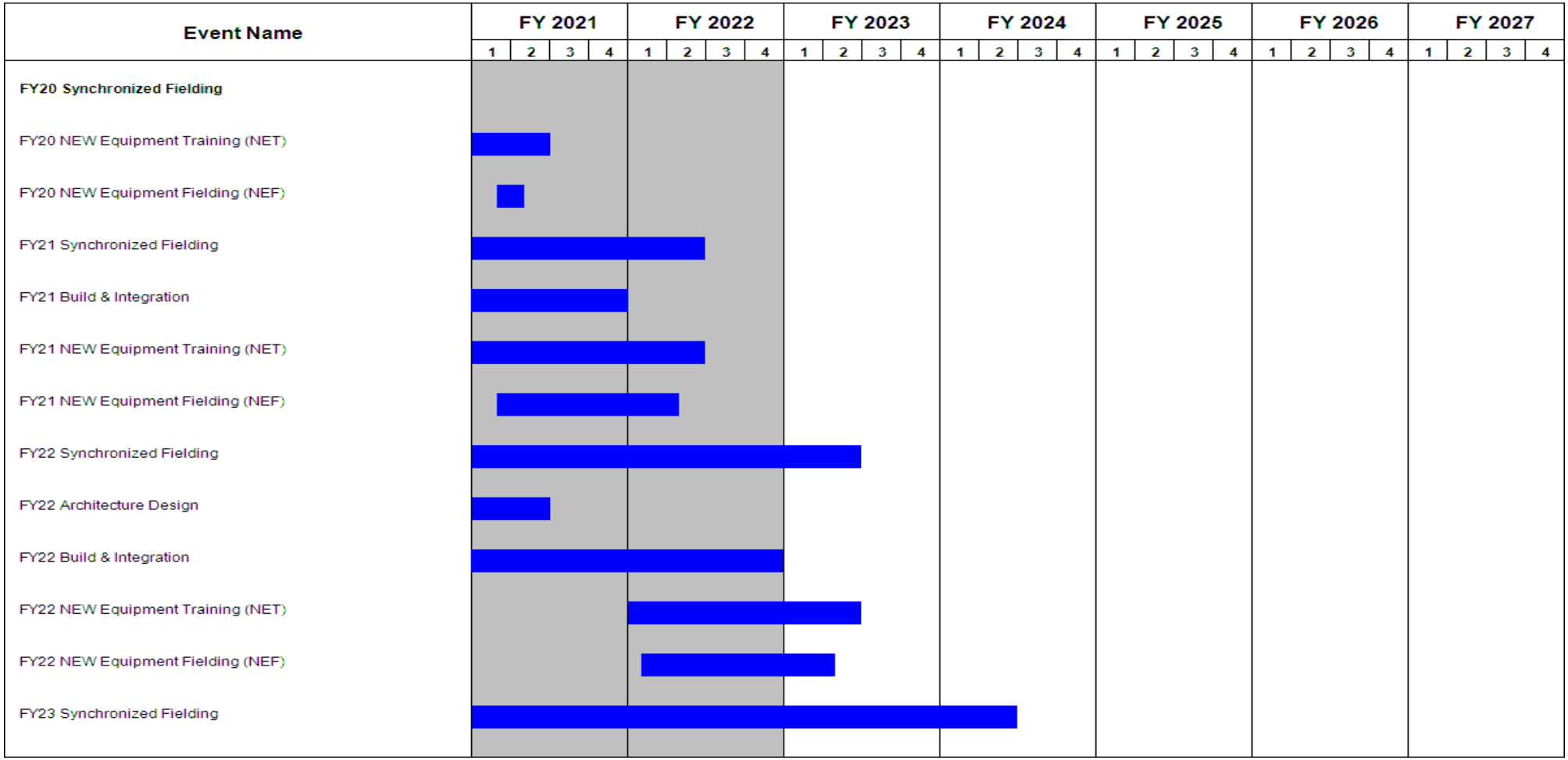
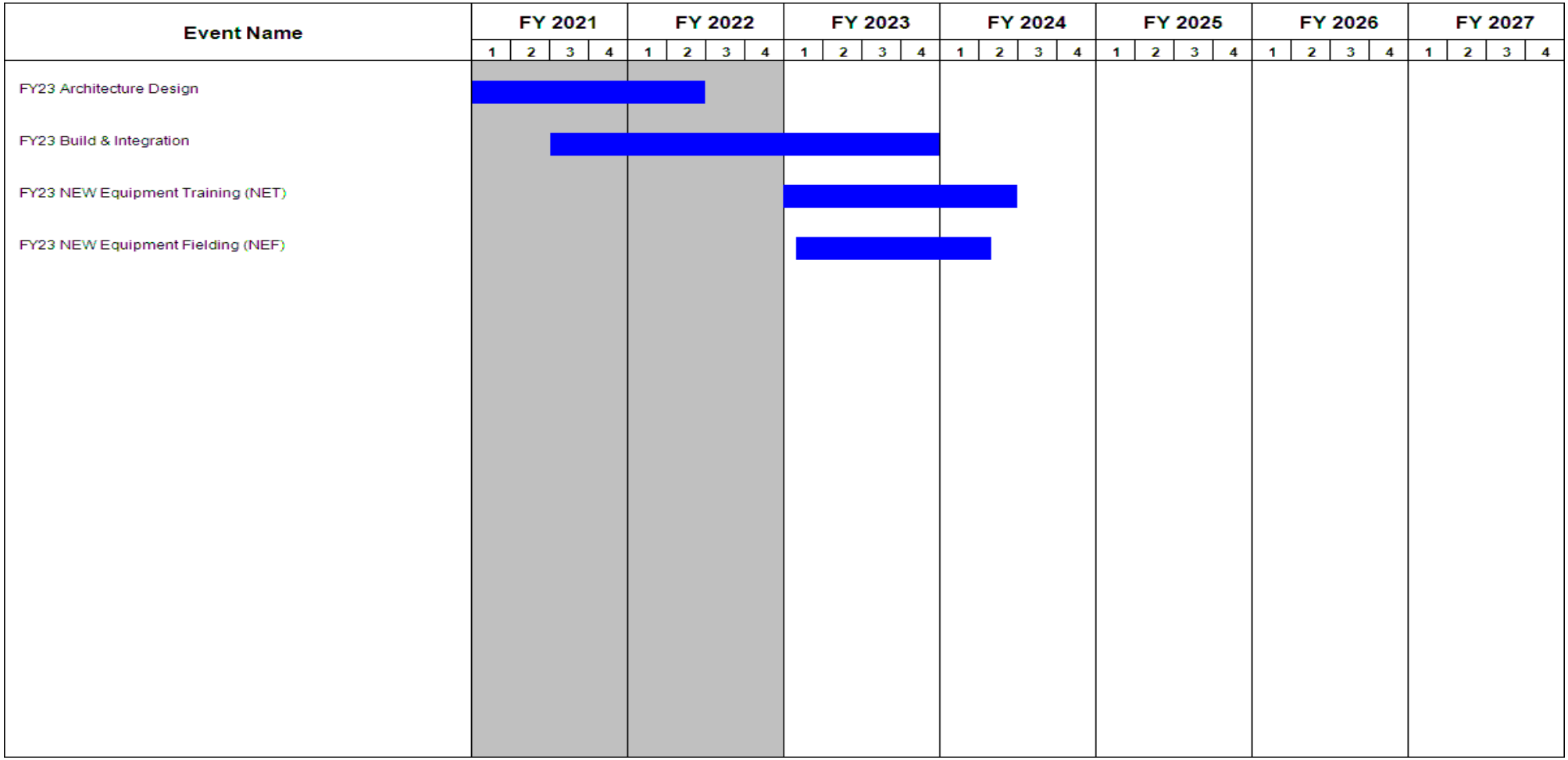


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY5 / *Production/Field Coordination for Capability Sets*



Note

None

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY5 / *Production/Field Coordination for Capability Sets*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY20 Synchronized Fielding	1	2018	2	2021
FY20 NEW Equipment Training (NET)	1	2020	2	2021
FY20 NEW Equipment Fielding (NEF)	1	2020	2	2021
FY21 Synchronized Fielding	1	2019	2	2022
FY21 Architecture Design	1	2019	2	2020
FY21 Build & Integration	3	2019	4	2021
FY21 NEW Equipment Training (NET)	1	2021	2	2022
FY21 NEW Equipment Fielding (NEF)	1	2021	2	2022
FY22 Synchronized Fielding	1	2020	2	2023
FY22 Architecture Design	1	2020	2	2021
FY22 Build & Integration	3	2020	4	2022
FY22 NEW Equipment Training (NET)	1	2022	2	2023
FY22 NEW Equipment Fielding (NEF)	1	2022	2	2023
FY23 Synchronized Fielding	1	2021	2	2024
FY23 Architecture Design	1	2021	2	2022
FY23 Build & Integration	3	2021	4	2023
FY23 NEW Equipment Training (NET)	1	2023	2	2024
FY23 NEW Equipment Fielding (NEF)	1	2023	2	2024

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604798A / *Brigade Analysis, Integration and Evaluation*	Project (Number/Name) DY7 / *Army Systems Engineering, Architecture & Analysis*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
DY7: *Army Systems Engineering, Architecture & Analysis*	-	17.702	21.423	21.228	-	21.228	21.464	21.495	21.157	21.272	0.000	145.741
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Synthesizing Systems Engineering Governance across the Program Executive Offices (PEOs) in support of the Assistant Secretary of the Army (Acquisition, Logistics and Technology)'s (ASA(ALT)) Mission.

This project provides for systems engineering efforts that enable the Army's leadership and materiel developers with the necessary modernization planning, System of Systems (SoS) engineering and analysis, technical risk analysis, architectural products, critical path analysis, cybersecurity and interoperability risk analysis and the associated mitigation planning for the Army's materiel portfolio. This project develops process, products, and policies that ensure a solid Army Systems Engineering construct across Army Program Executive and Management Offices. Under this Project there are three areas of concentration: Systems Engineering Governance, Engineering Strategic Guidance, and Engineering Support and Services.

This project includes specific efforts in support of the Army's Joint All Domain Command and Control (JADC2) efforts via Common Operating Environment (COE) governance, emerging Multi-Domain Operations (MDO) concepts requirements generation, resource allocation, experimentation, acquisition, logistics, and technology components of the Army's Modernization Strategy. Focus areas includes the integration of key elements of a system into one overall system engineering construct and managing it through major system engineering activities to ensure the fielding of integrated capabilities meet the mission needs of the force against any potential adversaries. Key system engineering functions include, engineering and technical risk analysis, integrated SoS architecture products, SoS risk analysis and mitigation planning to influence the Army's materiel portfolio. This project also includes the establishment of Army systems engineering policy and implementation standards, requirements decomposition and alignment, and resource and acquisition synchronization to address cross-portfolio issues. Key tasks are the development of integrated Architecture products; Engineering Analysis and Design; Portfolio Analysis; Systems Security Engineering process, interoperability assessments, independent risk assessments, Cybersecurity requirements analysis, compliance, Cyber policy assessments, and coordinates the ASA(ALT) community's Data activities including Data Steward and Functional Data Manager in Army Data Governance Forums.

The effort includes costs for labor (Government and contractor), support services, travel, training, supplies, facilities, and Information Technology (IT) support for Office of Chief Systems Engineer (OCSE). This project also includes support to other Department of Defense (DOD) and international agencies for joint programs and collaboration effort.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Systems Engineering Governance	-	-	6.048

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 Plans: OCSE will develop reference architecture products to support Capability Set (CS) 23 Integrated Tactical Network fielding, the CS 25 Integrated Tactical Network engineering design and fielding planning, and other fielding and integration activities as required. CS and other large scale Army equipment fielding activities occur every year, with biannual baseline updates, and provide modernization upgrades to entire formations (e.g. CS fields to brigade elements) in a single event. These supporting architecture products enable the ASA(ALT) community to determine integrated Basis of Issue planning, subnet design, spectrum allocation, network initialization, logistics planning for fielding activity, and non-recurring engineering planning and design as part of the overall ASA(ALT) engineering design, integration and fielding of the Army equipment. OCSE will deliver and maintain a fully capable Architecture Development Kit (ADK) to the ASA(ALT) systems engineering and architecture community for use. Using a Model Based Systems Engineering (MBSE) data-driven approach to Digital Engineering (DE) inside the ADK Environment, architects capture system data in the system of systems integrated architecture to include systems? unique requirements, capabilities, performance, interfaces, standards, dependences, and data flows, within the context of their operational employment and provide visual representation of key systems from an operational, functional and network perspective. This modeling allows for requirements traceability, reporting, analysis, and visualization. The ADK will be expanded to include the breadth of architecture being developed by ASA(ALT), allow other Army organizations a means to access and utilize the latest systems architecture data created by system owners, and ingest other Army architectures for use in the environment. The expanded toolsets will provide a standardized virtual interface for improved usability and increased commonality so that all users will have the same access to libraries, lexicon, nomenclature and style guides. User will be able to develop architecture products useful for their own acquisition process while being able to access other system data to improve their understanding of interoperability with external systems. User requested and/or developed analysis tools will be shared and leveraged across the environment; suggestion and feedback paths will be implemented to continuously improve available tools and data. Data from all systems will be easily aggregated to develop and analyze system of systems architecture. The resultant fully integrated systems of systems model, maintained with up-to-date system data, will allow leadership to quickly answer ?what if? system of systems architecture questions and improve the efficiency of the Request for Information (RFI) processes. OCSE supports COE Systems Engineering Governance by continuing to host ASA(ALT) monthly governance forums to promote convergence of legacy combat systems towards a common software and hardware infrastructure, effective migration of Army sensing capabilities towards common data sharing interface standards, and alignment of enterprise capabilities with tactical level services. This includes continuing to host a bi-weekly ASA(ALT) Configuration Control Board to optimize SoS risk reduction and preparatory actions prior to execution of Headquarters, Department of the Army (HQDA) G-6 independent Title 40 Army Interoperability Certification (AIC) test events. Secondly, OCSE will continue hosting the Standards IPT, DE IPT, Software Baseline IPT, and the Technical Advisory Board (TAB) to create and maintain ASA(ALT) SoS technical baseline artifacts in support of achieving COE Full Operational Capability (FOC) projected for 2025, as well as, continuing curation of the enterprise			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
level Fielded Software Tracker Database, user requested functionality enhancements, systems administration, and help desk support. OCSE represents and coordinates Acquisition Integrated Data Engineering Governance for the ASA(ALT) community?s in the area of data standards, priorities and activities in support of the Army?s Data Plan Implementation. OSCE supports the ASA(ALT) Data Steward and performs the duties as the Functional Data Manager in Army Data Governance Forums including the Army Data Board (ADB), Army Analytics Board (AAB) and JADC2 Working Groups. In addition to representing the ASA(ALT) in Army data forums the OCSE is actively improving the ASA(ALT) data environment through the establishment of governance forums, standards, policies and implementation guides in order to facilitate rapid and relevant acquisition, logistics and technology decisions. Continuous maturation of Acquisition, Logistics and Technology Domain data ensures that data is available for successful integration and support of product and program life-cycle requirements, additive and advanced manufacturing, DE, product/technical data, intellectual property management, modular open systems approach and other DoD and Army initiatives. OCSE has developed a roadmap for the digital transformation of the ASA(ALT) and has begun executing against that plan through the execution of data analytic use cases which delivers incremental value to the ASA(ALT) and the Army at large. OCSE will continue to transform the ASA(ALT)?s business processes in support of its digital and data centric transformation. OCSE serves as the primary ASA(ALT) staff point of contact for acquisition concerns related to cyberspace through the Chief Cyber Acquisition Officer. OCSE leads ASA(ALT) response to major cyberspace incidents requiring ASA(ALT) Principal leader awareness. This includes but is not limited to coordinating with PEO staffs at all levels in order to analyze requirements/ orders, facilitate guidance, present findings/status, and interface with Army Cyber Command (ARCYBER) and/or other HQDA organizations. In accordance with AR 70-75, coordinate Army survivability policy and guidance in Army acquisition efforts related to cyberspace. Represent HQDA on boards and committees concerning materiel survivability matters related to cyberspace. Coordinate and lead an assessment of the ASA(ALT) portfolio to apply a rigorous, systems engineering approach to consider cyber resilience within the Acquisition trade-space (e.g. performance attribute). Identify systemic vulnerabilities and coordinate the development and implementation of enterprise solutions to mitigate those vulnerabilities. Develop and implement a risk-based process to assess the impact of vulnerabilities and assist with prioritization of funding for corrective actions for high-risk vulnerabilities. Coordinate with PEO Simulation, Training and Instrumentation (STRI) regarding the certification and implementation of cyber acquisition assessment teams in order to facilitate the reduction of risk across the ASA(ALT) portfolio. Coordinate with PEO staffs on the integration of traditional cybersecurity (risk management framework) and cyber resilience survivability. Coordinate the Cyber Acquisition Task Force to unify strategy and execution of cyber resilience efforts across Army. Synchronize ASA(ALT) cyber resilience strategies with OSD, United States Cyber Command (USCYBERCOM), and joint Service counterparts.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY7 / *Army Systems Engineering, Architecture & Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
OCSE has drafted and is staffing the Army Priority Vulnerability Management Directive as directed by the Under Secretary of the Army to establish an enduring program (non-acquisition) to identify and manage cyberspace risks and maximize the survivability of tactical-strategic kill chains and enabling systems, and improve Total Force Readiness. Synchronize and integrate priority cyberspace assessments across National Security Systems? lifecycles including the Strategic Cybersecurity Program, Cyberspace Operational Resilience Assessment - Platform (CORA-P), and cyberspace red team activities. OCSE leads the CORA-P effort as the supported organization to oversee the planning, execution, and reporting of all key tasks, in accordance with HQDA EXORD 123-20. CORA-P is an enduring effort to maintain the readiness, survivability, and cyber resilience of Army and Joint Forces, capabilities, and systems by identifying and mitigation cyberspace vulnerabilities in critical systems including relevant portions of the DOD Information Network. Present overall status to the Army Cyberspace Council. Plan/program funding over the Future Year Defense Program and oversee distributed execution by stakeholders. Update, maintain, and publish the Terms of Reference to all stakeholders. Coordinate all reporting to Army, Joint, and DOD forums. Ensure the on-time completion of Cyber Vulnerability Assessments and reports. Pilot emerging cyber resilience efforts (e.g. Cyber Readiness Framework, mitigation mapping techniques, resilience metrics) in future assessments and extrapolate findings and best practices across ASA(ALT) portfolio. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The increased funding is for new titles that are "Planned Programs" which are NOT new-starts. These are ongoing engineering and technical efforts already planned. The FY22 labor categories (Army Systems of Systems Engineering and Analysis, Cyber and Data) have been reorganized into three new labor categories (Systems Engineering Governance, Engineering Support & Services, and Strategic Engineering Guidance) for FY23 to better represent and portray the current OCSE engineering and technical mission and direction moving forward. The same labor populated in the Army Systems of Systems Engineering and Analysis, Cyber and Data categories have been redistributed into the new OCSE engineering labor categories.			
Title: Engineering Support & Services	-	-	6.500
FY 2023 Plans: OCSE leads the Army?s development of policy and best practices to ensure systems engineering rigor in Army Acquisition. OCSE is the primary advisor to the Chief Systems Engineer and Army Acquisition Executive (AAE) regarding the sufficiency of systems engineering rigor in programs. The OCSE team collaborates with the Army?s systems engineering community to identify systemic systems engineering challenges and issues and their solutions, as well as identifying and sharing best practices. OCSE leads the immediate Army response to National Defense Authorization Act (NDAA) statutory requirements that involve systems engineering, as well as identifying and facilitating the best means to institutionalize those requirements. Additionally,			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
OCSE collaborates with the OSD, Industry and the Joint community in developing synchronized approaches to NDAA Systems Engineering related statutes. In order to promote program success, OCSE will continue to assist programs in the identification and mitigation of risk (i.e. Independent Technical Risk Assessment (ITRA), Preliminary and Critical Design Review (PDR/CDR) sufficiency assessments, Systems Engineering Plan (SEP), Life-Cycle Sustainment Plan (LCSP), and Systems Engineering Technical Reviews (SETR), etc.) and develop processes to support the necessary rigor and consistency across the Army, in support of any/all key milestone events. For Acquisition Category (ACAT) 1B/1C programs the Army will lead these efforts, and support the Deputy Under Secretary of Defense for Research and Engineering (USD(R&E)) for ACAT 1D programs. OCSE provides guidance and support to programs for development of systems engineering documentation required for milestone decisions and certification. Serves as the Army level concurrence authority on System Engineering Plans and provides systems engineering expertise for Program Protection Plans (PPPs) for all Army Major Defense Acquisition Programs (MDAPs). OCSE will also provide the AAE with an assessment of the MOSA implementation for ACAT 1B/1C programs and will review and recommend approval for the PEO?s approach to implementing MOSA across their responsible portfolio. OCSE will serve as the Army focal point for matters of hardware and software assurance, microelectronics, planning and countermeasures, and systems engineering focal point for program protection, anti-tamper, and PPPs. OCSE is the Army representative for the FY 2014 NDAA Section 937 Congressional requirement to stand up a Joint Federated Assurance Center (JFAC) to develop work plans, manage funding, track progress and report regular status to Army Leadership and OSD Leadership. In addition, also maintains direct collaboration and communication with Development Commands (DEVCOMs), Army Research Labs, and specifically the Software, Hardware and Cyber Subject Matter Experts and Communities of Practice, to define, federate, maintain and evolve, Army Cyber, System Security Engineering, and allow access to available Hardware/ Software Assurance (HwA/SwA) capabilities to meet today's threats and emerging threats. OCSE provides systems engineering expertise, oversight, review, and development assistance for PPPs to determine/review risks/identify vulnerabilities associated with Security and assess the planned countermeasures to mitigate issues. OCSE provides advice and experience to influence system design considerations in support of developing effective and resilient program protection strategies. Conducts client advocacy and education forums (Road Show presentations/Army Systems Engineering Forums) amongst Army PEOs/Chief Systems Engineers and other agencies and joint service stakeholders, to promulgate best practices to the acquisition community. Coordinates as an executive agent on matters of Anti-Tamper with program personnel, systems security engineers and service providers. OCSE serves as the primary responsibility for Software Assurance and Anti-Tamper. Provides alternate assurance options for critical DoD unique parts as part of the US Microelectronic Strategy. Provides advice, influence, and support to the Army?s Supply Chain Risk Management (SCRM) forums and Integrated Product Team (IPT), leveraging tools and expertise from the HwA and SwA communities. Advance the Army's capability to perform hardware analysis of critical components and transition to a new microelectronics trust model that leverages commercial state of the art practices. Provide systems engineering advice on Critical Intelligence Parameter Breach recommendations as described in Army regulations. In accordance with (IAW) FY 2017			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
NDAA Sec 807 Responsible for the conduct and execution of Post-PDR/CDR and ITRA for all Army ACAT 1/2 programs where the AAE serves as the Milestone Decision Authority (MDA). The reviews will provide recommendations on Technical Risk and PDR/CDR sufficiency, and both will be included in the MDA package for the Milestone Review, approval, and certification. A key element of OCSE support and services will be advancing the state of practice of DE across the ASA(ALT) community. This work will also seek to streamline communications between Government and Industry by identification of technical data and emphasis of appropriate implementation of technical data rights. Through the implementation of DE, OCSE will work with the PMs to institutionalize modern engineering processes and integrate those processes through the engineering data they produce in order to establish and maintain traceability from the activities that drive system concept development through system acquisition, fielding, and sustainment to the decision to divest. The Army?s DE implementation will establish a workforce equipped with the necessary skills and infrastructure to achieve this goal. To further the Army?s modernization efforts, OCSE synchronizes the Army's Modeling and Simulation (M&S) Strategy with OSD's DE Strategy to focus current and emerging efforts on the efficient development and use of M&S and MBSE capabilities in order to advance the Army's system development efforts. OCSE will continue in the development of MOSA policy and implementation guidance, in accordance with NDAA FY 2017 2466a/b/c, that leads to the certification of MOSA in MDAPs. Other responsibilities include confirming that Army programs proceeding to Milestone B have incorporated clearly defined major subsystem interfaces between the major system platform and major system components, between major system components, and between major system platforms, and that these major system interfaces are consistent with the widely supported and consensus-based standards. OCSE will continue primary responsibility for the overall Reliability, Availability, and Maintainability (RAM) program pertaining to materiel. Leads the assessment of RAM efforts of Army programs of record through a cross functional IPT that emphasizes lessons learned and best practices for RAM. Assist programs in the research for root causes of reliability issues and provide detailed assessment along with recommendation to senior leadership. OCSE will supervise the major RAM program elements to ensure that operationally focused, achievable, affordable, and testable RAM requirements are included in the requirements documentation and the Department of the Army (DA) decision-making process. Assist in Army staff evaluation of proposed changes to operational systems' RAM characteristics in product improvement programs. OCSE will serve as the ASA(ALT) staff lead for JADC2 / Multi Partner Environment (MPE) Technical Standards by providing ASA(ALT) technical representation on Joint Staff J6 and Army JADC2 technical governance forums. Additionally, OCSE will continue ASA(ALT) technical representation on the DoD Chief Information Officer (CIO) Technical Working Groups (TWGs) and Joint Enterprise Standards Committee (JESC) and conduct Service level review of Interoperability Standards Technical Packages			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
(ITSP) in support of Change Requests (CRs) to the DoD Information Technology Standards Repository (DISR) baseline IAW DoDI 8310.01. OCSE will continue to provide ASA(ALT) technical representation for Army pre-ratification review and staffing of American, British, Canadian, Australian, and New Zealand (ABCANZ) Technical Statement of Requirements (TSOR) in support of the Army Interoperability Campaign Plan and Mission Partner Environment (MPE) Concept of Operations (CONOPS). OCSE will serve as the lead to ensure ASA(ALT) complies with statutory and regulatory guidance, focused on increasing the use of commercial and non-governmental standards and specifications in Army acquisition programs. Additionally, the effort includes developing support tools and publishing a common desktop reference for ASA(ALT) PMs and Chief Engineers detailing statutory and regulatory mandates, best practices, tools, and training. OCSE will continue to provide overarching governance, promulgation, and integration of the Positioning, Navigation, and Timing (PNT) Reference Architecture (RA) with the COE technical baseline, review PM compliance strategies for technical risks, and provide endorsement recommendations to the ASA(ALT) Chief Systems Engineer (CSE). OCSE serves as the Program Information System Security Manager (ISSM) for ASA(ALT) HQ. OCSE supports the CSE as Authorizing Official (AO) for ASA(ALT) HQ in order to establish and monitor the HQ cybersecurity program that includes cybersecurity objectives and policies, cybersecurity personnel, and cybersecurity processes and procedures. Function as the primary cybersecurity technical advisor to the AO and managerial lead for RMF throughout the command. Ensure cybersecurity-related events or configuration changes that may impact authorizations or security postures are formally reported to the AO and other stakeholders such as information owners and AOs of interconnected systems. Monitor compliance with cybersecurity policies, as appropriate, and review the results of such monitoring. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The increased funding is for new titles that are "Planned Programs" which are NOT new-starts. These are ongoing engineering and technical efforts already planned. The FY22 labor categories (Army Systems of Systems Engineering and Analysis, Cyber and Data) have been reorganized into three new labor categories (Systems Engineering Governance, Engineering Support & Services, and Strategic Engineering Guidance) for FY23 to better represent and portray the current OCSE engineering and technical mission and direction moving forward. The same labor populated in the Army Systems of Systems Engineering and Analysis, Cyber and Data categories have been redistributed into the new OCSE engineering labor categories.			
Title: Strategic Engineering Guidance	-	-	8.257
FY 2023 Plans:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
OSCE will serve as the Army focal in the Office of the Under Secretary of Defense for Research and Engineering (OUSD (R&E)) Mission Engineering Community of Practice (CoP) to facilitate the development of recommendations, policies, guidelines, practices, and toolsets. OCSE?s engagement in the Mission Engineering CoP will encourage the use of Mission Engineering within the Army community. This will be accomplished by updating the Mission Engineering Guide, maturing the Mission Engineering state of practice, and communicating governance to the Army engineering community. OCSE will support responsible organizations within the Army and foster Mission Engineering expertise and workforce development. Provide continued Mission Engineering, JADC2, and MDO analysis as it pertains to system development and ASA(ALT) equities. Continue to analyze JADC2 impact on Army modernization strategy and the Army?s role in MDO supporting ASA(ALT) with quick turn, independent, first-order engineering analysis to support leadership decision making to enable the Army Modernization Strategy. Continue to support Project Convergence 23 and 24 planning, design, and execution, JADC2 planning and design, DE efforts at the Office of the Secretary of Defense, (OSD), Army, and ASA(ALT) levels, and Army architecture governance efforts. OCSE will continue to expand Critical Criteria and Convergence Learning (C3L) tool use at the PEO and PM level. C3L is designed to enhance system of systems engineering rigor for MDO designated capabilities. The C3L provides a set of criteria categories that, when provided with some basic inputs on system type, intended purpose, and intended environment, provide feedback to the system owner in terms of considerations needed or identify gaps not address that are required to support an MDO scenario. These considerations can also be leveraged to begin to determine if a system meets the overmatch, Operational Environment 2040, and procurement outcomes outlined by the Vice Chief of Staff of the Army (VCSA). The tool is designed to be tailorable, flexible, reusable, and intuitive for a user to navigate with the possibility for automated aspects. Further integrate C3L into the ADK tool set such that system owners leveraging the ADK to build out their system architecture can also leverage an automated C3L tool to provide a cursory look at their system?s integration within an MDO construct. As the National Defense Strategy and Army Senior Leadership have emphasized increased speed of delivery of capabilities to the Warfighter, OCSE works with PEOs/Program Managers (PMs), along with other Army Commands on enabling processes and tools in order to accelerate the Army?s acquisition process, from requirements development through delivery of capability to the field and rapid technology insertion or upgrades. OCSE will continue to implement and assess the Modular Open System Approaches (MOSA) by refining and developing implementation guidance and supporting PM development of MOSA architectures. Elements will include identifying and prioritizing key system attributes into functional, modular components that provide the greatest operational effects on the battlefield, and support the fielding of a MDO-capable force by 2028 and an MDO-ready force by 2035. These efforts will encompass the development planning process to rapidly identify and refine requirements and speed development from concept to solution. OCSE will continue to assist the Army by assessing whether emerging capabilities should be transitioned into programs of record, by means of a Systems Engineering Assessment Review (SEAR) and/or ITRA process. Further support is provided by the OCSE role in facilitating the rapid integration of emerging technology through			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
MOSA. Amplify the impact and benefits of MOSA with the use of Common Modular Open Architectures (CMOA) that enable faster, more efficient capability upgrades and technology insertion. OCSE hosts the Product Data and Engineering Working Group (PEWG) which provides a collaboration forum focused on product and technical data with representatives from across the Army who perform activities throughout the system development and acquisition lifecycle. This includes product and technical data SMEs that collaborate and synchronize responses to questions related to the technical and product data needs that support modernization requirements across these organizations. PEWG members collaborate to work through details of strategic Army initiatives, and facilitate the transition of technical data throughout the product development lifecycle. OCSE is the Army?s lead for the implementation of DE. OCSE has developed a Vision for DE and initiated the development and publication of a DE Policy and DE Implementation Guidance that is aligned with the DoD DE Strategy. The OCSE represents the Army in OSD DE forums and is the point of contact within the Army for the governance and processes required for the execution of NDAA, DoD, and Army mandates that involve systems and DE. OCSE leads Army collaboration with OSD for systems and DE issues, and identifies and advocates for Army equities during the establishment and implementation of DoD policy involving systems engineering. OCSE has been assigned the responsibility for leading a Digital Thread Operational Integrated Product Team (OIPT) with members from across the Army in order to develop the requirement for the Digital Thread in support of the Army modernization. The Digital Thread is a framework that will provide a means to integrate digital artifacts across organizational boundaries and establishes traceability from initial concept through a fielded and supported piece of equipment and system. OCSE is the lead for the Acquisition Community at the Army M&S General Officer Steering Committee (GOSC), Council of Colonels (CoC), and other M&S forums. OCSE provides guidance to PEOs and PMs to plan for the integrated use of M&S throughout the acquisition lifecycle and coordinates M&S activities within the Army Acquisition Community. OCSE provides notifications and updates to the ASA(ALT) Deputy Assistant Secretaries of the Army (DASAs) in ASA(ALT) and PEO CIOs points of contact to alert them of the proposed requirements and migration schedule to the Microsoft (MS) Teams Impact Level 5 (IL5) environment. OCSE will continue to update the ASA(ALT) portion of the Army 365 Migration Hub in order to better coordinate the required migration tasks. OCSE will establish strategic engineering guidance for cyberspace by developing and overseeing the implementation of technical processes and tools. Develop objective architecture (e.g. data structures, warehouses, interactions, products) and drive implementation of Information Security Architectures from a SoS perspective. As needed, coordinate engineering change request			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
to federate existing Army business processes and systems. Synchronize with Army policy/strategy and with mission system owners. As needed, conduct engineering-assessments of crosscutting cyber focused architectures, solutions, and capabilities proposed by Programs of Record, Cross Functional Teams, and Rapid Capabilities and Critical Technologies Office. Increase engineering rigor though policies, processes, tools, and technical oversight across systems and systems-of-systems in order to maximize the cyberspace survivability of the Army Acquisition portfolio. Define, publish, and revise as needed a standardized Cyber Acquisition Discipline Artifact for PMs to demonstrate the repeatable implementation of cyber survivability attributes during decision point reviews. Develop and maintain an Implementation Guidebook to improve awareness and consistency of related planning and execution. Support the AAE in reviewing the Cyber Acquisition Discipline Implementation Assessment during decision reviews for all Acquisition Category 1 and 2 programs, as well as MDAs/DAs for other systems as requested. Lead the development of cyberspace contract language requirements and templates, and publish in policy for the acquisition workforce. IAW AR-70-75, represent HQDA on boards and committees concerning materiel survivability matters related to cyberspace resilience. Serve as HQDA lead responsible for tracking and monitoring cyberspace remediation (find-fix-verify) as recommended by the Department of Defense Office of Inspector General (DODIG). Provide engineering governance for emerging cyberspace-related capabilities and advances to include artificial intelligence, cloud-computing governance, Development, Security and Operations (DevSecOps), supply chain risk management, zero trust, etc. Ensure ASA(ALT)?s cyber-related roadmaps align with Army/DoD CIO regarding data, cloud migration, data centers, etc. Analyze requirements and opportunities, and publish ASA(ALT) internal Technical Bulletins and other information papers to inform PMs. Coordinate with capability developers to establish systems engineering criteria in order to ensure new requirements documents address cyber resilience. Coordinate with Army Materiel Command to establish policy and processes that shall maintain cybersecurity and survivability for programs transitioning to sustainment. Lead, in coordination with HQDA G-3/5/7, the establishment of the materiel component of the cyber readiness framework as an interface between systems and operations, which requires authoritative and accessible data from the acquisition and sustainment communities to reduce operational risk. OCSE will lead, plan, integrate and synchronize information cybersecurity efforts across ASA(ALT) including PEOs and headquarters. Identify crosscutting issues and opportunities from across the PEOs requiring ASA(ALT) senior leader attention. Represent ASA(ALT) cybersecurity equities in external stakeholder forums (e.g. Army Cyberspace Council, CIO Executive Board). Review and shape all cyberspace related strategies, policies, and orders affecting ASA(ALT) from OSD, HQDA, and ARCYBER; and elevate issues to the Chief Systems Engineer as needed. Synchronize architectures between enterprise and acquisition systems. Support critical modernization of unsupported software for secure operations. Assist and respond with data call requests, synchronization efforts, and IPRs with DoD CIO and the HQDA G-6, ARCYBER, and the VCSA. Leverage cybersecurity policy as a technology enabler. Fulfill cybersecurity functions mandated by public law, federal directives, and DoD/Army policy. Coordinate, optimize, and monitor Risk Management Framework (RMF) execution among PEOs, assist with common issues requiring senior leader attention, and liaise with CIO and the HQDA G-6. Ensure appropriate transfer of Enterprise Mission Assurance Support Service (eMASS) records for systems that transitioned to sustainment. Serve as approval			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
authority for ASA(ALT) HQ eMASS accounts and Army Training & Certification Tracking System (ATCTS) records, as well as for reviewing and approving system transfers to sustainment in the Army Program Management System (APMS). As the Army implements the Army?s People Strategy, OCSE supports the functional lead for Engineering by identifying skills gaps and recommending the needed training. OCSE will also promotes workforce development efforts to improve the level of systems engineering competency through credentials that provide focused enhanced skills in DE, Cyber, and Data engineering. This will include engineering support to OSD and the Army to oversee the growth of civilian talent to support ASA(ALT) Systems Engineering requirements. This includes recommending improvements in Training, Education, Rotational Assignments, and Mentoring for a Systems Engineering (SE) work force across the Army. OCSE will support ASA(ALT) in the development of the Human Capital Strategic Plan (HCSP) and refinement of the System Engineering Functions with OSD. OCSE will serve as the ASA(ALT) lead for System Security Engineering (SSE). Army requires a professional and effective SSE workforce, which is separate from information system security management (ISSM) or network defense functions. SSE contributes to a broad-based, holistic security perspective and focus within the systems engineering (SE) discipline. SSE ensures stakeholder protection needs and security concerns are properly identified and addressed in all engineering stages of the system life cycle. Coordinate with OUSD to define the DoD body of knowledge for SSE. Ensure duties align with prescribed training, experience, and certification. Coordinate appointment and implementation, and facilitate collaboration across PEOs through meetings and publications. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The increased funding is for new titles that are "Planned Programs" which are NOT new-starts. These are ongoing engineering and technical efforts already planned. The FY22 labor categories (Army Systems of Systems Engineering and Analysis, Cyber and Data) have been reorganized into three new labor categories (Systems Engineering Governance, Engineering Support & Services, and Strategic Engineering Guidance) for FY23 to better represent and portray the current OCSE engineering and technical mission and direction moving forward. The same labor populated in the Army Systems of Systems Engineering and Analysis, Cyber and Data categories have been redistributed into the new OCSE engineering labor categories.			
Title: Facilities and IT Support ***Description:*** Provides funding for infrastructure/facilities and IT support. ***FY 2022 Plans:***	0.233	0.233	0.423

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Provide funding for infrastructure/facilities. It includes the costs for purchasing/leasing hardware, software, computers, communications equipment and services. ***FY 2023 Plans:*** Provides funding for infrastructure and facilities, including the costs for purchasing and leasing hardware, software, computers, communications equipment and services. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increased funding support a slight increase in computer hardware and software requirements.			
Title: Army System of Systems Engineering and Analysis ***Description:*** Provided coordinated SoS engineering, architectures, and analysis products for integrating new technologies with existing capabilities to stakeholders (e.g. materiel developers, TRADOC Capability Manager (TCM), Army Capabilities Integration Center (ARCIC), etc.) to deliver integrated solutions to Army formations. ***FY 2022 Plans:*** . ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The decreased funding are due to the changes in titles because the FY22 labor categories (Army Systems of Systems Engineering and Analysis, Cyber and Data) have been reorganized into three new labor categories (Systems Engineering Governance, Engineering Support & Services, and Strategic Engineering Guidance) for FY23 to better represent and portray the current OCSE engineering and technical mission and direction moving forward. The same labor populated in the Army Systems of Systems Engineering and Analysis, Cyber and Data categories have been redistributed into the new OCSE engineering labor categories.	13.875	14.844	-
Title: Cyber ***Description:*** This project funds cyber support to PEOs/PMs to include cybersecurity support to risk management framework, cyber engineering and architecture development, industry cybersecurity engagement, and cyber program oversight and governance, which ensures the secure, affordable, and effective delivery of Army materiel solutions that address critical Army modernization objectives, as well as the delivery of agile and advanced cyber solutions to equip the Army?s offensive and defensive forces in the cyberspace domain. These funds support synchronization, analysis and integration of Cyber functions and products. ***FY 2022 Plans:***	3.594	3.733	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Perform the functions of the Chief Cyber Acquisition Officer (CCAO), ASA(ALT) Chief Information Security Officer (CISO), ASA(ALT) Engineering Governance for Cyberspace (Policy and System-of-Systems Engineering), Army lead for Cyber Operational Resilience Assessments ? Platform (CORA-P), and the Cybersecurity Program lead for ASA(ALT) Headquarters. Lead a coordinated, comprehensive acquisition approach to enhance cyber resiliency and survivability across ASA(ALT) communities and the materiel enterprise. Optimize cybersecurity as a critical enabler of capability delivery. Facilitate and ensure execution of cyber-related tasks and efforts by appropriate ASA(ALT) organizations. Represent and advocate for ASA(ALT) cyberspace equities in external governance bodies, senior leader forums, and partner engagements. Shape cyberspace policy, directives and orders that may impact acquisition. Deliver systemic and crosscutting value to PMs executing cyber-related missions. Army Futures Command (AFC). Engage AFC to institutionalize support for ASA(ALT) Cyber Discipline in order to begin system survivability and cyber resilience efforts early in the acquisition lifecycle. Chief Cyber Acquisition Officer (CCAO): Serve as primary ASA(ALT) staff point of contact for acquisition concerns related to cyberspace. Lead ASA(ALT) response to major cyberspace incidents requiring ASA(ALT) Principal leader awareness. This includes but is not limited to coordinating with PEO staffs at all levels in order to analyze requirements/orders, facilitate guidance, present findings/status, and interface with Army Cyber Command (ARCYBER) and/or other Headquarters, Department of the Army (HQDA) organizations. In accordance with AR 70-75, coordinate Army survivability policy and guidance in Army acquisition efforts related to cyberspace. Represent HQDA on boards and committees concerning materiel survivability matters related to cyberspace. Coordinate and lead an assessment of the ASA(ALT) portfolio to apply a rigorous, systems engineering approach to consider cyber resilience within the Acquisition trade-space (e.g. performance attribute). Identify systemic vulnerabilities and coordinate the development and implementation of enterprise solutions to mitigate those vulnerabilities. Develop and implement a risk-based process to assess the impact of vulnerabilities and assist with prioritization of funding for corrective actions for high-risk vulnerabilities. Coordinate with PEO STRI regarding the certification and implementation of cyber acquisition assessment teams in order to facilitate the reduction of risk across the ASA(ALT) portfolio. Coordinate with PEO staffs on the integration of traditional cybersecurity (risk management framework) and cyber resilience survivability. Coordinate the Cyber Acquisition Task Force to unify strategy and execution of cyber resilience efforts across Army. Synchronize ASA(ALT) cyber resilience strategies with OSD, USCYBERCOM, and joint Service counterparts. Engineering Governance for Cyberspace (Policy): Establish and oversee systems engineering governance that positions the Army to fight and win in a contested cyberspace domain by maximizing survivability and operational resilience of delivered Army acquisition systems. Increase engineering rigor though policies, processes, tools, and technical oversight across systems and systems-of-systems in order to maximize the cyberspace survivability of the Army Acquisition portfolio. Define, publish and revise as needed a standardized Cyber Acquisition Discipline Implementation Assessment for PMs to demonstrate the repeatable implementation of cyber survivability attributes			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
during decision point reviews. Develop and maintain an Implementation Guidebook to improve awareness and consistency of related planning and execution. Support the AAE in reviewing the Cyber Acquisition Discipline Implementation Assessment during decision reviews for all Acquisition Category 1 and 2 programs, as well as MDAs/DAs for other systems as requested. IAW AR-70-75, represent HQDA on boards and committees concerning materiel survivability matters related to cyberspace resilience. Serve as HQDA lead responsible for tracking and monitoring cyberspace remediations (find-fix-verify) as recommended by DODIG. Provide engineering governance for emerging cyberspace-related capabilities and advances to include artificial intelligence, cloud-computing governance, DevSecOps, supply chain risk management, etc. Ensure ASA(ALT)?s cyber-related roadmaps align with Army/DoD CIO regarding data, cloud migration, data centers, etc. Analyze requirements and opportunities, and publish ASA(ALT) internal Technical Bulletins and other information papers to inform PMs. Coordinate with Army Futures Command to establish systems engineering criteria in order to ensure new requirements documents address cyber resilience. Coordinate with Army Materiel Command to establish policy and processes that shall maintain cybersecurity and survivability for programs transitioning to sustainment. Coordinate with HQDA G-3/5/7 to establish the materiel component of the cyber readiness framework as an interface between systems and operations, which requires authoritative and accessible data from the acquisition and sustainment communities to reduce operational risk. Engineering Governance for Cyberspace (SoS Engineering): Establish engineering governance by developing and overseeing the implementation of technical processes and tools. Army is working on an authoritative acquisition lifecycle data and a standardized and automated continuous monitoring (CM) process for Army acquisition vulnerability management that enables timely data-informed decisions for the operation and defense of the DoDIN-A. Develop objective architecture (e.g. data structures, warehouses, interactions, products) and drive implementation of Information Security Architectures from a system-of-systems perspective. As needed, coordinate engineering change request to federate existing Army business processes and systems. Synchronize with Army policy/strategy and with mission system owners. As needed, conduct engineering-assessments of crosscutting cyber focused architectures, solutions, and capabilities proposed by PORs, CFTs, and RCCTO. Army lead for Cyberspace Operational Resiliency Assessment - Platform (CORA-P): Lead CORA-P as the supported organization to oversee the planning, execution, and reporting of all key tasks, in accordance with HQDA EXORD 123-20. CORA-P is an enduring effort to maintain the readiness, survivability, and cyber resilience of Army and Joint Forces, capabilities, and systems by identifying and mitigation cyberspace vulnerabilities in critical systems including relevant portions of the DOD Information Network. Present overall status to the Army Cyberspace Council GOSC. Plan/program funding over the Future Year Defense Program and oversee distributed execution by stakeholders. Develop and distribute Terms of Reference to all stakeholders. Coordinate all reporting to Army, Joint, and DOD forums. Ensure the on-time completion of Cyber Vulnerability Assessment Reports. Pilot emerging cyber resilience efforts (e.g. Cyber Readiness Framework, mitigation			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
mapping techniques, resilience metrics) in future assessments and extrapolate findings and best practices across ASA(ALT) portfolio. ASA(ALT) Chief Information Security Officer (CISO): Lead, plan, integrate and synchronize cybersecurity efforts across ASA(ALT) including PEOs and headquarters. Identify crosscutting issues and opportunities from across the PEOs requiring ASA(ALT) senior leader attention. Represent ASA(ALT) cybersecurity equities in external stakeholder forums (e.g. Army Cyberspace Council, CIO Executive Board). Review and shape all cyberspace related strategies, policies, and orders affecting ASA(ALT) from OSD, HQDA, and ARCYBER; and elevate issues to the Chief Systems Engineer as needed. Synchronize architectures between enterprise and acquisition systems. Support critical modernization of unsupported software for secure operations. Assist and respond with data call requests, synchronization efforts, and IPRs with DoD Chief Information Officer and the HQ G6, ARCYBER, and the Vice Chief of Staff of the Army (VCSA). Examples: Federal Information Security Modernization Act (FISMA), DoD Cybersecurity Scorecard, Windows / unsupported software migrations, HQDA Execution Orders (EXORD), Army Cyber Command (ARCYBER) Operations Orders (OPORD). Leverage cybersecurity policy as a technology enabler. Fulfill cybersecurity functions mandated by public law, federal directives, and DoD/Army policy. Coordinate, optimize, and monitor RMF execution among PEOs, assist with common issues requiring senior leader attention, and liaise with Chief Information Officer and the HQ G6. Ensure appropriate transfer of Enterprise Mission Assurance Support Service (eMASS) records for systems that transitioned to sustainment. Serve as approval authority for ASA(ALT) HQ eMASS accounts and Army Training & Certification Tracking System (ATCTS) records, as well as for reviewing and approving system transfers to sustainment in the Army Program Management System (APMS). OCSE serves as the ASA(ALT) lead for System Security Engineering (SSE). Army requires a professional and effective systems security engineering (SSE) workforce, which is separate from information system security management (ISSM) or network defense functions. SSE contributes to a broad-based, holistic security perspective and focus within the systems engineering (SE) discipline. SSE ensures stakeholder protection needs and security concerns are properly identified and addressed in all engineering stages of the system life cycle. Coordinate with OUSD to define the DoD body of knowledge for SSE. Ensure duties align with prescribed training, experience, and certification. Coordinate appointment and implementation, and facilitate collaboration across PEOs through meetings and publications. Cybersecurity Program for ASA(ALT) HQ: OCSE serves as Program Information System Security Manager (ISSM) for ASA(ALT) HQ, establish and monitor the HQ cybersecurity program that includes cybersecurity objectives and policies, cybersecurity personnel, and cybersecurity processes and procedures. Support the CSE as Authorizing Official (AO) for ASA(ALT) HQ. Function as the primary cybersecurity technical advisor to the AO and managerial lead for RMF throughout the command. Ensure cybersecurity-related events or configuration changes that may impact authorizations or security postures are formally reported to the AO and other stakeholders such as			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
information owners and AOs of interconnected systems. Monitor compliance with cybersecurity policies, as appropriate, and review the results of such monitoring. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The decreased funding are due to the changes in titles because the FY22 labor categories (Army Systems of Systems Engineering and Analysis, Cyber and Data) have been reorganized into three new labor categories (Systems Engineering Governance, Engineering Support & Services, and Strategic Engineering Guidance) for FY23 to better represent and portray the current OCSE engineering and technical mission and direction moving forward. The same labor populated in the Army Systems of Systems Engineering and Analysis, Cyber and Data categories have been redistributed into the new OCSE engineering labor categories.			
Title: Data ***FY 2022 Plans:*** OCSE represents and coordinates the ASA(ALT) community?s data activities across the Army Modernization Enterprise (AME). OSCE supports the ASA(ALT) Data Steward and performs the duties as the Functional Data Manager in Army Data Governance Forums including the Army Data Board (ADB), Army Analytics Board (AAB) and Joint All Domain Command and Control (JADC2) Working Groups. In addition to representing the ASA(ALT) in Army data forums the OCSE is actively improving the ASA(ALT) data environment through the establishment of governance forums, standards, policies and implementation guides in order to facilitate rapid and relevant acquisition decisions. Continuous maturation of the Acquisition Data Domain (ADD) ensures that technical data is available for successful integration and support of product and program life-cycle requirements, additive and advanced manufacturing, digital engineering, product/technical data, intellectual property management, modular open systems approach and other AME initiatives. OCSE has developed a roadmap for the digital transformation of the ASA(ALT) and has begun executing against that plan through the execution of data analytic use cases which provide minimum viable products (MVP) and delivers incremental value to the AME. OCSE will continue to deliver MVPs for data analytic use cases and as appropriate scale these MVPs across the enterprise in order to transform the ASA(ALT)?s business processes in support of its digital and data centric transformation. OCSE hosts the Product Data and Engineering Working Group (PEWG) which provides a collaboration forum focused on product and technical data with representatives from the ASA(ALT), Army Futures Command (AFC), and Army Materiel Command (AMC). This group includes a collection of product and technical data SMEs that collaborate and synchronize responses to questions related to the technical and product data needs that support modernization requirements across these organizations. PEWG members collaborate to work through details of strategic Army initiatives, and facilitate the transition of technical data throughout the product development lifecycle.	-	2.166	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
The OCSE is the Army?s lead for the implementation of Digital Engineering. OCSE has developed a Vision for Digital Engineering and initiated the development of a Digital Engineering Policy. The OCSE will complete the approval and publication of the Digital Engineering Policy in FY21. Follow-on efforts will include the approval and publication of a Digital Engineering Implementation Guidance aligned with the DoD Digital Engineering Strategy. The OCSE represents the Army in OSD Digital Engineering forums and is the point of contact within the Army for the governance and processes required for the execution of NDAA, DoD, and Army mandates that involve systems and digital engineering. OCSE leads Army interaction with OSD for systems and digital engineering issues, and identifies and advocates for Army equities during the establishment and implementation of DoD policy involving systems engineering. OCSE has been given the responsibility for leading a Digital Thread Operational Integrated Product Team (OIPT) in order to define and develop the requirement for the Digital Thread in support of the Army Modernization Enterprise. This cross-organization team includes representatives from (ASA)ALT HQ, PEOs, AMC, HQDA G4, and AFC. The Digital Thread will provide a means to integrate digital artifacts which link cross organizational efforts in a manner that facilitates traceability from initial concept through a fielded and supported piece of equipment. OCSE is the lead for the Acquisition Community at the Army Modeling and Simulation (M&S) general officer steering committee (GOSC), council of colonels (CoC), and other M&S forums. OCSE provides guidance to PEOs and PMs to plan for the integrated use of M&S throughout the acquisition lifecycle and coordinates M&S activities within the Army Acquisition Community. Additionally, efforts continue to formally establish governance, policies and standards that support systems engineering efforts across the Army Modernization Enterprise. OCSE continues as the primary action office for the duration of the ASA(ALT) migration to Office 365 (O365), as designated by the HQDA G-6. Continue to provide notifications and updates to the ASA(ALT) DASAs and PEO CIOs points of contact to alert them of the proposed requirements and migration schedule to the Microsoft (MS) Teams Impact Level 5 (IL5) environment. The OCSE will continue to update the ASA(ALT) O365 Migration Hub in the MS Teams CVR environment to better coordinate the required migration tasks. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The decreased funding are due to the changes in titles because the FY22 labor categories (Army Systems of Systems Engineering and Analysis, Cyber and Data) have been reorganized into three new labor categories (Systems Engineering Governance, Engineering Support & Services, and Strategic Engineering Guidance) for FY23 to better represent and portray the current OCSE engineering and technical mission and direction moving forward. The same labor populated in the Army Systems			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
of Systems Engineering and Analysis, Cyber and Data categories have been redistributed into the new OCSE engineering labor categories.			
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC 638. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC 638.	-	0.447	-
Accomplishments/Planned Programs Subtotals	17.702	21.423	21.228

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• DY5: *Production/Field Coordination for Capability Sets*	1.035	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

This project does not have any requirement for direct procurement of hardware or software.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR / STTR Transfer	TBD	Various : None	0.339	-		0.447	Apr 2022	-		-		-	Continuing	Continuing	-
		Subtotal	0.339	-		0.447		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Army System of System Engineering and Analysis Core Labor	Allot	Office of the Chief Systems Engineer (OCSE) : Various	15.747	5.456	Nov 2019	6.234	Nov 2019	-		-		-	Continuing	Continuing	-
Army System of System Engineering and Analysis Matrix Labor	MIPR	Various : Various	3.246	1.742	Nov 2019	1.400	Nov 2019	-		-		-	Continuing	Continuing	-
Army System of System Engineering and Analysis SETA Labor	C/CPFF	TBD : Various	8.329	4.825	Nov 2019	4.574	Nov 2019	-		-		-	Continuing	Continuing	-
Army System of System Engineering and Analysis FFRDC Labor	FFRDC	MITRE : Various	10.436	2.146	Nov 2019	2.475	Nov 2019	-		-		-	Continuing	Continuing	-
Common Operating Environment (COE) Core Labor	Allot	SoSE&I : Various	1.428	0.175	Nov 2019	0.161	Nov 2019	-		-		-	Continuing	Continuing	-
Cyber Core Labor	Allot	Office of the Chief Systems Engineer (OCSE) : Various	4.781	1.718	Nov 2019	1.772	Nov 2019	-		-		-	Continuing	Continuing	-
Cyber Matrix Labor	MIPR	Various : Various	1.227	0.418	Nov 2019	0.584	Nov 2019	-		-		-	Continuing	Continuing	-
Cyber SETA Labor	C/CPFF	TBD : Various	0.845	0.358	Nov 2019	0.727	Nov 2019	-		-		-	Continuing	Continuing	-
Cyber FFRDC Labor	FFRDC	MITRE : Various	2.073	0.704	Nov 2019	0.650	Nov 2019	-		-		-	Continuing	Continuing	-
Data Core Labor	Allot	Office of the Chief Systems Engineer (OCSE) : Various	-	-		0.801	Nov 2019	-		-		-	Continuing	Continuing	-
Data Matrix Labor	MIPR	Various : Various	-	-		0.400	Nov 2019	-		-		-	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Data SETA Labor	C/CPFF	TBD : Various	-	-		0.640	Nov 2019	-		-		-	Continuing	Continuing	-
Data FFRDC Labor	FFRDC	MITRE : Various	-	-		0.325	Nov 2019	-		-		-	Continuing	Continuing	-
Systems Engineering Governance Core Labor	TBD	Office of the Chief Systems Engineer (OCSE) : Various	-	-		-		1.980	Nov 2019	-		1.980	Continuing	Continuing	-
Systems Engineering Governance Matrix Labor	TBD	Various : Various	-	-		-		0.854	Nov 2019	-		0.854	Continuing	Continuing	-
Systems Engineering Governance SETA Labor	TBD	TBD : Various	-	-		-		2.244	Nov 2022	-		2.244	Continuing	Continuing	-
Systems Engineering Governance FFRDC Labor	TBD	MITRE : Various	-	-		-		0.970	Nov 2019	-		0.970	Continuing	Continuing	-
Engineering Support and Services Core Labor	TBD	Office of the Chief Systems Engineer (OCSE) : Various	-	-		-		2.259	Nov 2019	-		2.259	Continuing	Continuing	-
Engineering Support and Services Matrix Labor	TBD	Various : Various	-	-		-		0.975	Nov 2019	-		0.975	Continuing	Continuing	-
Engineering Support and Services SETA Labor	TBD	TBD : Various	-	-		-		2.560	Nov 2022	-		2.560	Continuing	Continuing	-
Engineering Support and Services FFRDC Labor	TBD	MITRE : Various	-	-		-		0.706	Nov 2019	-		0.706	Continuing	Continuing	-
Strategic Engineering Guidance Core Labor	TBD	Office of the Chief Systems Engineer (OCSE) : Various	-	-		-		2.910	Nov 2019	-		2.910	Continuing	Continuing	-
Strategic Engineering Guidance Matrix Labor	TBD	Various : Various	-	-		-		1.255	Nov 2019	-		1.255	Continuing	Continuing	-
Strategic Engineering Guidance SETA Labor	TBD	TBD : Various	-	-		-		3.298	Nov 2022	-		3.298	Continuing	Continuing	-
Strategic Engineering Guidance FFRDC Labor	TBD	MITRE : Various	-	-		-		0.794	Nov 2019	-		0.794	Continuing	Continuing	-
		Subtotal	48.112	17.542		20.743		20.805		-		20.805	Continuing	Continuing	N/A

Remarks

Note: 1

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604798A / *Brigade Analysis, Integration and Evaluation*	Project (Number/Name) DY7 / *Army Systems Engineering, Architecture & Analysis*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
- Program Activities performed at Aberdeen Proving Ground (MD), Taylor Bldg, (Crystal City, VA), Pentagon, (Washington DC), TACOM (Warren, MI)															

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Facilities and IT Support	TBD	Various: Note: 1 : TBD	4.542	0.160	Nov 2019	0.233	Nov 2019	0.423	Nov 2019	-		0.423	0.423	5.781	-
		Subtotal	4.542	0.160		0.233		0.423		-		0.423	0.423	5.781	N/A

Remarks

Note:1
- Program Activities performed at Aberdeen Proving Ground (MD), Taylor Bldg, (Crystal City, VA), Pentagon, (Washington DC), TACOM (Warren, MI)

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	52.993	17.702		21.423		21.228		-		21.228	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY7 / *Army Systems Engineering, Architecture & Analysis*

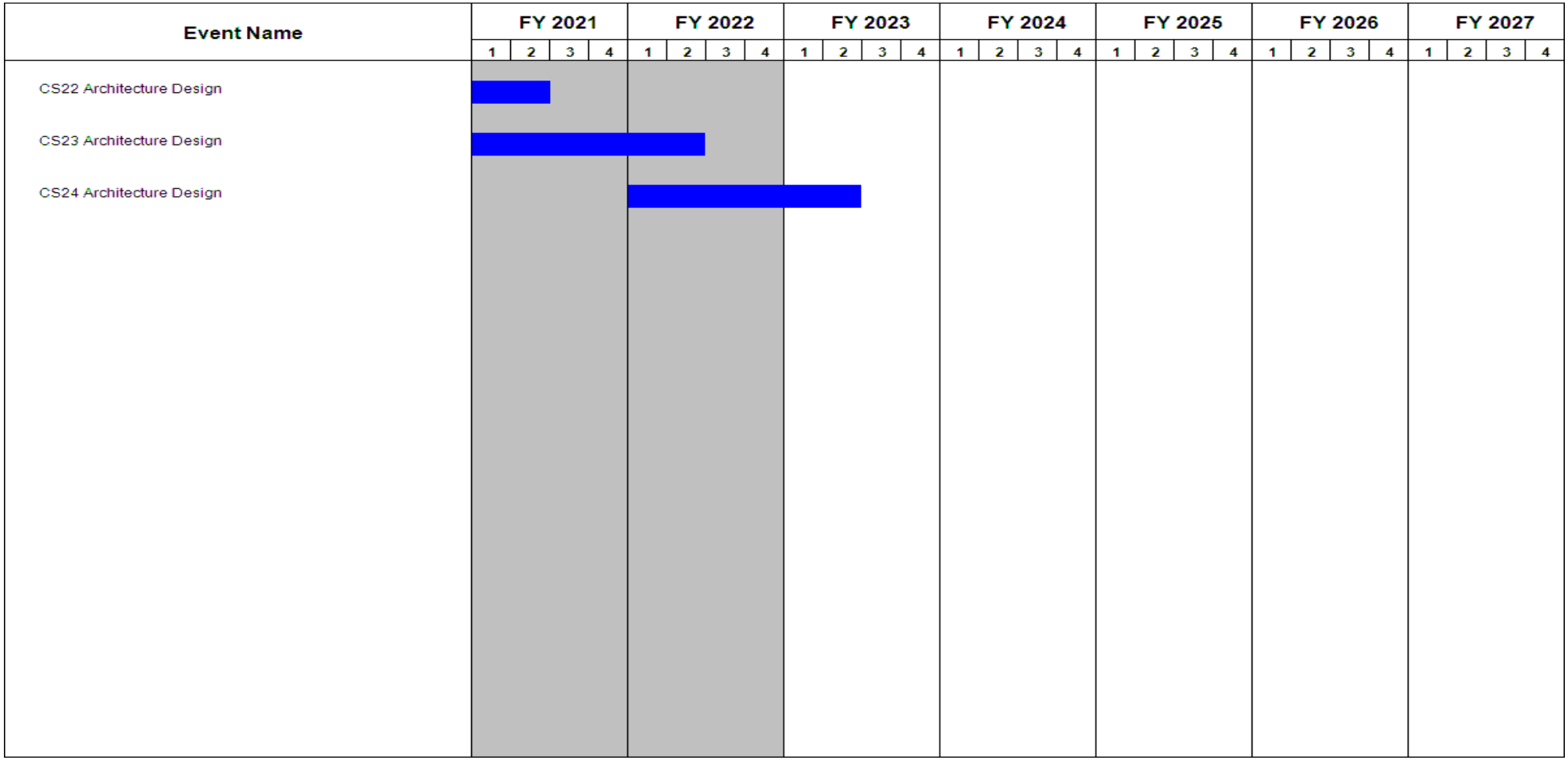


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604798A / *Brigade Analysis, Integration and Evaluation*	**Project (Number/Name)** DY7 / *Army Systems Engineering, Architecture & Analysis*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CS22 Architecture Design	1	2020	2	2021
CS23 Architecture Design	1	2021	2	2022
CS24 Architecture Design	1	2022	2	2023
COE V3.0 CPCE/MCE CDR	1	2018	1	2018

Note

Capability Set (CS)

Common Operating Environment (COE):
Army Interoperability Certification (AIC), Command Post Computing Environment (CPCE), Critical Design Review (CDR), Mounted Computing Environment (MCE), Network Integration Evaluation (NIE), Operational Test (OT)

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	277.344	297.086	263.778	-	263.778	194.941	112.823	75.407	73.414	0.000	1,294.793
613: *MORTAR SYSTEMS*	-	0.497	-	1.036	-	1.036	-	-	-	-	0.000	1.533
BQ3: *155mm Artillery Propulsion XM654*	-	-	29.803	26.485	-	26.485	15.217	-	-	-	0.000	71.505
BY1: *Next Generation Combat Vehicle Ammunition*	-	22.176	33.867	33.778	-	33.778	34.747	6.547	-	-	0.000	131.115
CE3: *Precision Munition (Sniper)*	-	-	9.275	5.182	-	5.182	-	-	-	-	0.000	14.457
EC4: *Non-Standard Simulator Munitions*	-	2.154	2.116	2.182	-	2.182	2.178	0.408	0.409	0.413	0.000	9.860
EL9: *Ammunitions Logistics Prototyping*	-	1.639	0.696	1.022	-	1.022	1.047	1.066	1.067	1.077	0.000	7.614
EP2: *Shoulder-Launched Munitions*	-	10.011	0.987	-	-	-	-	-	-	-	0.000	10.998
EP3: *Reduced Range Ammunition - Small Caliber*	-	13.816	11.150	5.214	-	5.214	-	-	-	-	0.000	30.180
EP4: *One-Way Luminescence for Small Caliber Ammo*	-	13.467	4.896	7.565	-	7.565	3.079	-	-	-	0.000	29.007
EP7: *Aviation Airborne Expendable Countermeasures*	-	4.313	7.526	6.363	-	6.363	-	-	-	-	0.000	18.202
EU4: *40mm HV Improved High Explosive Dual Purpose*	-	9.357	2.111	2.073	-	2.073	-	-	-	-	0.000	13.541
EU5: *.50 Caliber All-Purpose Tactical cartridge (APTC)*	-	3.931	-	-	-	-	-	-	-	-	0.000	3.931
EU6: *155mm HE Rocket Assist Project Extended Range*	-	51.956	27.655	14.382	-	14.382	29.380	15.911	2.701	-	0.000	141.985
EU7: *Enhanced Lethality Cannon Munitions*	-	15.000	-	-	-	-	-	-	-	-	0.000	15.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*							
EU8: *Improved Multi-Option Fuze*	-	7.700	4.562	-	-	-	-	-	-	-	0.000	12.262
EW1: *40mm Low Velocity Ammunition*	-	20.259	3.640	2.045	-	2.045	2.157	2.951	-	-	0.000	31.052
FA6: *30mm Lethality*	-	22.359	8.939	8.653	-	8.653	3.078	-	-	-	0.000	43.029
FJ4: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	-	20.079	85.997	92.402	-	92.402	86.869	70.359	55.644	56.185	0.000	467.535
FL4: *Small Caliber Ammo for Next Gen Squad Weapons*	-	26.483	28.372	25.558	-	25.558	12.058	12.168	12.172	12.291	0.000	129.102
S36: *Precision Guidance Kit*	-	32.147	35.494	29.838	-	29.838	5.131	3.413	3.414	3.448	0.000	112.885

A. Mission Description and Budget Item Justification

A portion of this funding line is a key enabler of the Army Modernization Priorities in support of the Long-Range Precision Guidance Kit (LR-PGK) and the Cannon Delivered Area Effects Munitions (C-DAEM).

Project 613, Mortar Systems: 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 remote mortar turrets for mounted mortar systems, future cannon design study and improvements, round counter design effort, high-pressure capable cannons/components, and composite/lightweight components for mounted/dismounted systems as well any future mortar modernization efforts to improve system capability and performance to meet future capability gaps. 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 and modularity (plug and play capability), integration with existing/future platform interfaces to meet Modular Open Architecture Standard (MOSA), and support for commercial off-the-shelf (COTS)/ modified commercial off-the-shelf (MCOTS) fire control components. FY 2023 funding will support Infantry Brigade Mortar System (IBMS) development and prototyping of a man-portable system for the Infantry Brigade Combat Teams (IBCTs) with range and lethality equal to or greater than the 120mm battalion mortar weapon system.

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 Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). Supercharge 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, integral metal Stub Case, electrically initiated primer, and advanced artillery propellant. This project supports the accelerated Urgent Materiel Release (UMR) Supercharge (bag configuration) qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA to perform FY 2024 Operational Assessment, and also supports the development of the Full Materiel Release (FMR) Supercharge that will address high technology and integration risks unique to achieving extended range to include improved design opportunities for pressure temperature curve, cannon tube wear and ensure fielding robustness. FY 2023 funding will conclude safety qualification of the UMR Supercharge, improve propellant for longer cannon life, conduct risk reduction activities and

continue component development and testing of the FMR Supercharge. These efforts directly support the Army's Long Range Precision Fires Cross Functional Team (LRPF CFT) priorities in support of the National Defense Strategy.

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) 2023 funding will support Design Engineering Test (DET) 2 for HEAB-T performance as well as Developmental Test and Evaluation (DT&E) for TP-T and APFSDS-T cartridges

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) 2023 funding supports development of the AM munitions, evaluation of ammunition prototypes/concepts, and prototype build and testing. FY 2023 also supports evaluating industry/Government Subsonic and IPR munitions solutions.

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; Macro Pyro to simulate hostile fire, booby trap and IED Simulations indoor and outdoors; 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; Antitank Guided Missile and Rocket (AGMR) simulator to replicate surface to air missile or shoulder launched rocket; 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.

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) 2023 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).

Project EP2, Shoulder-Launched Munitions: The Individual Assault Munition (IAM) system consists of the tactical XM919 and training devices including the XM922 sub-caliber trainer. The XM919 IAM will be a lightweight Shoulder Launched Munition (SLM) capability for combat units at the individual Soldier level. The IAM training devices including the XM922 sub-caliber trainer provide training capability that will increase the Soldier's proficiency and integration of the XM919 tactical system into combat operations. 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 tactical 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.

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) 2023 funding supports completing Engineering and Manufacturing Development (EMD) efforts, completing 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 2023 also includes completing the EMD effort, complete safety release testing, conducting a Limited User Assessment (LUA) / User Evaluation, and completing 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) 2023 funding will

support continuing Engineering and Manufacturing Development (EMD), performing Production Qualification Testing (PQT), conducting Live Fire Test and Evaluation (LFT&E), 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 2023 funding will also support EMD efforts, performing PQT, conducting LFT&E, and a Soldier Touch Point (STP) / User Evaluation for the 5.56mm variant.

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 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 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).

Project EU4, 40 millimeter (mm) High Velocity (HV) High Explosive Dual Purpose - Air burst (HEDP-AB) is a new capability identified as a Warfighter counter-defilade requirement 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. XM1176 HEDP-AB cartridges are manufactured by de-fuzing legacy M430A1 cartridges and installing a new airburst capable fuze onto the M430A1 warhead. FY 2023 funding supports the Live Fire Testing & Evaluation (LFT&E) that is required due to the program being on Director, Operational Test & Evaluation (DOT&E) Oversight.

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) 2023 request.

Project EU6, 155mm HE Rocket Assist Project Extended Range: 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 XM1210 (formerly known as XM1113ER) 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) 2023 funding will support the completion of XM1113 qualification activities, engineering efforts to evaluate test data to ensure that the projectile is safe, suitable and operationally effective as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and Full Materiel Release (FMR). FY 2023 funding will also support XM1210 qualification and firing tables testing required for Safety Release for First Unit Issued (FUI) to support the ERCA Operational Assessment, Urgent Materiel Release (UMR) qualification activities and the initiation of FMR development activities.

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 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. This Project does not have a Fiscal Year (FY) 2023 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. This Project does not have a Fiscal Year (FY) 2023 budget request.

Project EW1, The 40 millimeter (mm) Low Velocity High Explosive Air Burst (HEAB) is a new capability identified as a Warfighter counter-defilade 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 2023 activities will include the continuation of Developmental Test & Evaluation (DT&E), support for Milestone C, execution of an additional Soldier Touch Point (STP 4) and the award of a follow on Low Rate Initial Production (LRIP) contract.

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),

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604802A *I Weapons and Munitions - Eng Dev*

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) 2023 funding will support the continuation of Engineering, Manufacturing and Development (EMD) for all cartridges to include completion of Developmental Test & Evaluation (DT&E), preparation and execution of Milestone C decision, platform integration testing, and Live Fire Test & Evaluation (LFT&E) hardware fabrication and test assets.

Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM): 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) 2023 funding will continue to support the development and testing of the selected C-DAEM Armor solution(s) for Urgent Materiel Release (UMR) and engineering efforts required to integrate the NavStorm-M (M-Code) 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. The Army has approved the Israeli M999 advanced anti-personnel munition, now designated the U.S. model XM1208, as the C-DAEM DPICM Replacement solution. FY 2023 funding will support the completion of XM1208 qualification activities and support engineering efforts to evaluate test data to ensure DoD policy compliance and that the round is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C.

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) 2023 funding supports performing optimization efforts on the GP variant. FY 2023 also supports continuing rapid prototyping for the SP projectile, manufacturing prototype ammunition required for Developmental Testing (DT), and conducting DT. FY 2023 supports continuing rapid prototyping efforts to develop RRA and RRA-Tracer for the NGSW, continuing weapon and cartridge integration efforts, and executing projectile optimization efforts. FY 2023 also supports continuing rapid prototyping effort to develop tracer ammunition for the NGSW, building and testing tracer ammunition prototypes, and maturing/refining down-selected tracer ammunition design. FY 2023 supports continuing rapid prototyping effort to mature the Blank ammunition and activities to accelerate the development/maturation of Blank ammunition designs. FY 2023 also supports continuing 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 2023 also supports continuing the refining and development of the DDI and HPT cartridges.

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) 2023 funding supports the build and safety and development testing of the LR-PGK Urgent Materiel Release (UMR) configuration as well as development of the Full Materiel Release (FMR) design configuration.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	268.858	309.778	0.000	-	0.000
Current President's Budget	277.344	297.086	263.778	-	263.778
Total Adjustments	8.486	-12.692	263.778	-	263.778
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-12.564			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	8.486	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	263.778	-	263.778
• FFRDC Transfer	-	-0.128	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: EU6: *155mm HE Rocket Assist Project Extended Range*		
Congressional Add: *Precision Guidance Aft*	21.000	-
Congressional Add Subtotals for Project: EU6	21.000	-
Project: EU7: *Enhanced Lethality Cannon Munitions*		
Congressional Add: *155mm XM1128 High Explosive Projectile*	15.000	-
Congressional Add Subtotals for Project: EU7	15.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604802A *I Weapons and Munitions - Eng Dev*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Congressional Add Totals for all Projects	36.000	-

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) 613 / *MORTAR SYSTEMS*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
613: *MORTAR SYSTEMS*	-	0.497	-	1.036	-	1.036	-	-	-	-	0.000	1.533
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 remote mortar turrets for mounted mortar systems, future cannon design study and improvements, round counter design effort, high-pressure capable cannons/components, tactical vehicle integration and composite/lightweight components for mounted/dismounted systems as well any future mortar modernization efforts to improve system capability and performance to meet future capability gaps. 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 and modularity (plug and play capability), integration with existing/future platform interfaces to meet Modular Open Architecture Standard (MOSA), and support for commercial off-the-shelf (COTS)/modified commercial off-the-shelf (MCOTS) fire control components. FY 2023 funding will support Infantry Brigade Mortar System (IBMS) development and demonstration of a man-portable system for the Infantry Brigade Combat Teams (IBCTs) with range and lethality equal to or greater than the 120mm battalion mortar weapon system.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Mortar System & Fire Control Modernization	0.497	-	1.036
Description: 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.			
FY 2023 Plans: FY 2023 funding will support Infantry Brigade Mortar System (IBMS) development and demonstration of a man-portable system for the Infantry Brigade Combat Teams (IBCTs) with range and lethality equal to or greater than the 120mm battalion mortar weapon system. Efforts include studies of new steel barrel materiel, new barrel design and testing to address current and future IBCT capability gaps. The design will encompass studying of new barrel technology, market surveys of new steel materiel, and prototyping and testing of newly developed barrel design concepts. The objective for the new design will be to provide extended range, reduced pressure, seamless platform integration and reduction in weight. The light weight design will allow soldiers to perform mounted and dismounted operation seamlessly.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** 613 / *MORTAR SYSTEMS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY22 was a skip year of funding. FY23 funding necessary to support IBMS development and demonstration of a man-portable system.			
Accomplishments/Planned Programs Subtotals	0.497	-	1.036

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• AD9300: *Mortar Fire Control Systems Modifications*	7.292	2.830	4.370	-	4.370	3.243	3.335	4.614	4.613	0.000	30.297
• K99200: *Computer Ballistics: LHMBC XM32*	7.789	2.811	3.038	-	3.038	3.026	3.094	6.760	6.757	0.000	33.275
• K99300: *Mortar Fire Control System*	17.472	17.236	4.879	-	4.879	4.936	4.874	3.886	3.904	0.000	57.187
• G02200: *Mortar Systems*	20.748	32.985	8.516	-	8.516	6.961	8.733	14.849	14.487	Continuing	Continuing
• G02100: *Mortar Modification*	1.689	-	0.000	-	0.000	-	-	-	-	0.000	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 will utilize Government Owned Government Operated (GOGO) Watervliet Arsenal (WVA) facility for cannon barrel prototyping, Combat Capabilities Development Command Armament Center (DEVCOM AC) for studies and competitively awarded Department of Defense Ordnance Technology Consortium (DOTC) and/or Cornerstone Other Transaction Agreement (OTA) initiatives for hardware and software development during Engineering Manufacturing Design Phase. A Federal Acquisition Regulation (FAR) contract will be awarded to complete full rate production.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) 613 / *MORTAR SYSTEMS*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar System & Fire Control Modernization - Project Manager Office Support	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.212	-		-		0.025	Nov 2022	-		0.025	0.000	0.237	-
		Subtotal	0.212	-		-		0.025		-		0.025	0.000	0.237	N/A

Remarks

Program management includes travel and documentation support.

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar Stowage Lift System	MIPR	Other Transaction Agreement (OTA) : TBS	-	-		-		0.386	Dec 2022	-		0.386	0.000	0.386	-
		Subtotal	-	-		-		0.386		-		0.386	0.000	0.386	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mortar System & Fire Control Modernization Engineering Support	MIPR	DEVCOM Armament Center : Picatinny Arsenal, NJ and Watervliet Arsenal, NY	-	0.497	Mar 2021	-		0.625	Oct 2022	-		0.625	0.000	1.122	-
		Subtotal	-	0.497		-		0.625		-		0.625	0.000	1.122	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) 613 / *MORTAR SYSTEMS*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.212	0.497		-		1.036		-		1.036	0.000	1.745	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** 613 / *MORTAR SYSTEMS*

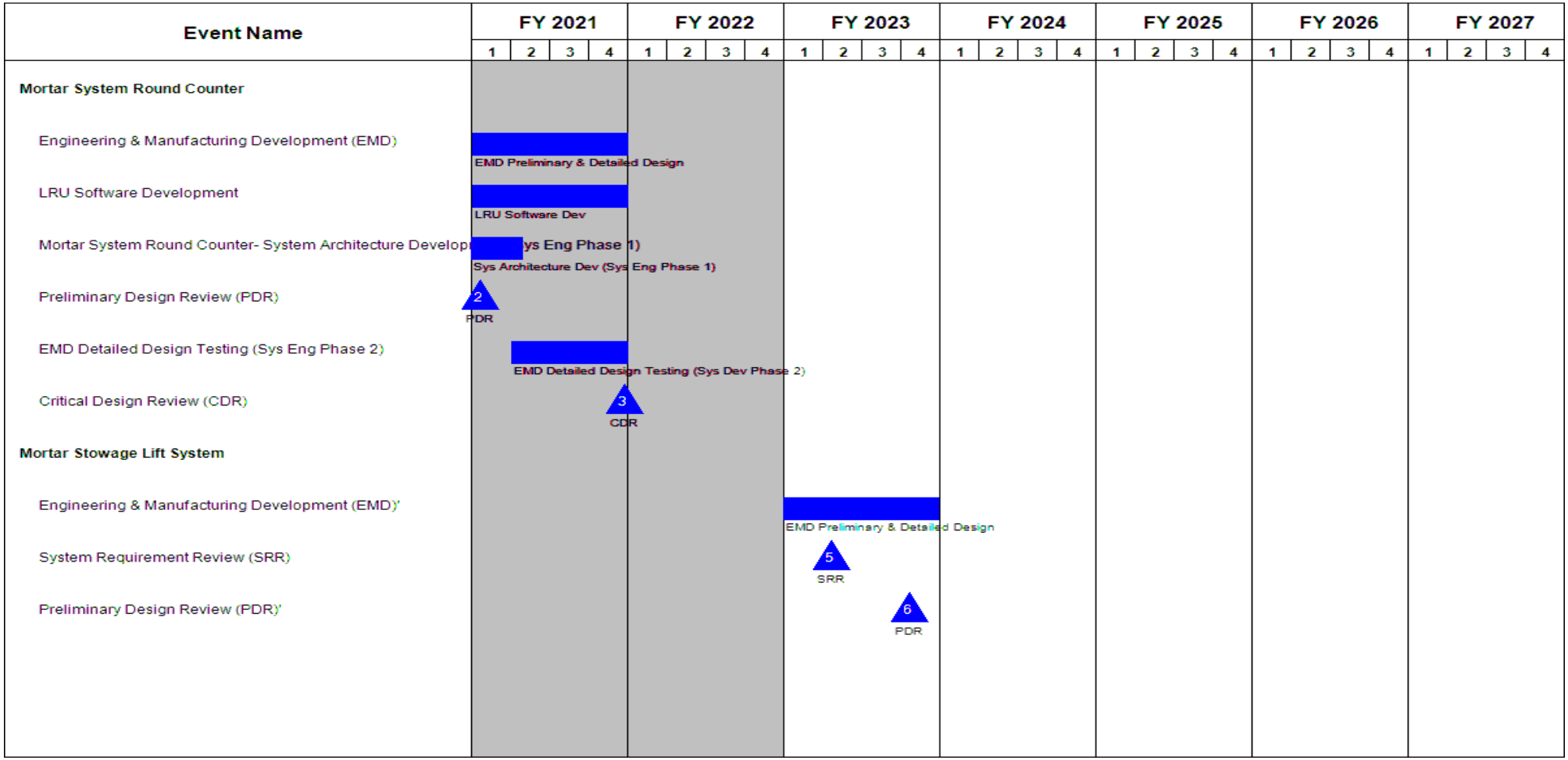


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** 613 / *MORTAR SYSTEMS*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Mortar System Round Counter	1	2021	1	2021
Engineering & Manufacturing Development (EMD)	1	2020	4	2021
LRU Software Development	1	2020	4	2021
Mortar System Round Counter- System Architecture Development (Sys Eng Phase 1)	1	2020	1	2021
Preliminary Design Review (PDR)	1	2021	1	2021
EMD Detailed Design Testing (Sys Eng Phase 2)	2	2021	4	2021
Critical Design Review (CDR)	4	2021	4	2021
Mortar Stowage Lift System	1	2023	1	2023
Engineering & Manufacturing Development (EMD)'	1	2023	4	2023
System Requirement Review (SRR)	2	2023	2	2023
Preliminary Design Review (PDR)'	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BQ3: *155mm Artillery Propulsion XM654*	-	-	29.803	26.485	-	26.485	15.217	-	-	-	0.000	71.505
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). Supercharge 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, integral metal stub case, electrically initiated primer, and advanced artillery propellant. This project supports the accelerated Urgent Materiel Release (UMR) Supercharge (bag configuration) qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA to perform FY 2024 Operational Assessment, and also supports the development of the Full Materiel Release (FMR) Supercharge that will address high technology and integration risks unique to achieving extended range to include improved design opportunities for pressure temperature curve, cannon tube wear and ensure fielding robustness. FY 2023 funding will conclude safety qualification of the UMR Supercharge, improve propellant for longer cannon life, conduct risk reduction activities and continue component development and testing of the FMR Supercharge. 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)	FY 2021	FY 2022	FY 2023
Title: 155mm Artillery Propulsion Supercharge	-	28.715	26.485
Description: The top-zone propelling charge for XM907E2 Extended Range Cannon with Slide-block breech for use with Extended Range Cannon Artillery (ERCA) to gain range overmatch for 155mm artillery. ***FY 2022 Plans:*** Fiscal Year (FY) 2022 funding supports UMR Supercharge qualification required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA to perform Operational Assessment. This project will also establish a digital thread as well as conduct risk reduction activities and component development of FMR Supercharge. ***FY 2023 Plans:*** FY 2023 funding will conclude safety qualification of the UMR Supercharge, improve propellant for longer cannon life, conduct risk reduction activities and continue component development and testing of the FMR Supercharge. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding decreases with the completion of safety qualification of UMR Supercharge.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	-	1.088	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: FY 2022 funding to be assess per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 SBIR/STTR to be assessed within year of execution.			
Accomplishments/Planned Programs Subtotals	-	29.803	26.485

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• BQ4: *155mm Artillery Propulsion XM654*	15.131	-	0.000	-	0.000	-	-	-	-	0.000	15.131
• E99350: *155mm Artillery Supercharge XM654*	-	0.010	7.802	-	7.802	16.891	29.337	45.020	63.773	0.000	162.833

Remarks

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

D. Acquisition Strategy

The Supercharge Project consists of critical technology prototyping, testing, and demonstration of two variants: (1) the UMR Supercharge (2-piece Bag configuration) to support the acceleration of the Extended Range Cannon Artillery (ERCA) to achieve precision lethality at 70km and greater in FY 2023 and follow-on UMR, and (2) the FMR Supercharge, which will address high technology and integration risks unique to achieving increased range.

The UMR Supercharge will utilize several competitively awarded Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) Initiatives for the maturation and integration of components. These contracts will execute UMR Supercharge through qualification testing as well as transition to procurement of quantities required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA to perform Operational Assessment. Federal Acquisition Regulation (FAR) based production contract(s) will be awarded for UMR quantities.

The FMR Supercharge will also utilize several competitively awarded DOTC OTA Initiatives for design risk reduction of the various new and existing Supercharge components, system integration, developmental testing and qualification. Propulsion risk reduction activities will be applied to address UMR Supercharge temperature sensitivity, energy, tube wear, rough handling robustness and muzzle pressure/ blast overpressure. FAR based production contract(s) will be awarded.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-	-		0.300	Oct 2021	0.300	Oct 2022	-		0.300	0.000	0.600	-
FY 2022 Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	Various	Various : N/A	-	-		1.088	Mar 2022	-		-		-	0.000	1.088	-
		Subtotal	-	-		1.388		0.300		-		0.300	0.000	1.688	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combustible Case Components	MIPR	DoD Ordnance Technology Consortium (DOTC): Armtec : Coachella, CA	-	-		3.171	Nov 2021	3.000	Nov 2022	-		3.000	0.000	6.171	-
Main Charge Propellants	MIPR	DoD Ordnance Technology Consortium (DOTC): General Dynamics Ordnance and Tactical Systems - Valleyfield : Salaberry-de-Valleyfield, Quebec, Canada	-	-		3.434	Oct 2021	1.368	Nov 2022	-		1.368	0.000	4.802	-
Electric Primers	MIPR	Day & Zimmermann Lone Star LLC : Texarkana, TX	-	-		0.425	Apr 2022	0.225	Mar 2023	-		0.225	0.000	0.650	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Packaging	MIPR	DoD Ordnance Technology Consortium (DOTC): Savit Corporation : Rockaway, NJ	-	-		0.522	Apr 2022	0.550	Mar 2023	-		0.550	0.000	1.072	-
Main Load Assemble & Pack	MIPR	DoD Ordnance Technology Consortium (DOTC): General Dynamics Ordnance and Tactical Systems - Marion, IL : Marion, IL	-	-		1.650	Nov 2021	2.500	Nov 2022	-		2.500	0.000	4.150	-
Supercharge FMR Risk Reduction	TBD	Various/ TBS : TBS	-	-		4.700	Mar 2022	7.792	Mar 2023	-		7.792	0.000	12.492	-
Projectile and Fuze Hardware	Various	Various : Various	-	-		6.906	Nov 2021	3.800	Mar 2023	-		3.800	0.000	10.706	-
Software Engineering	Reqn	Leidos, Inc. : Reston, Virginia	-	-		1.350	Aug 2022	1.200	Aug 2023	-		1.200	0.000	2.550	-
		Subtotal	-	-		22.158		20.435		-		20.435	0.000	42.593	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		4.210	Nov 2021	3.750	Nov 2022	-		3.750	0.000	7.960	-
		Subtotal	-	-		4.210		3.750		-		3.750	0.000	7.960	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BQ3 / *155mm Artillery Propulsion XM654*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Supercharge UMR Qualification	MIPR	Army Test & Evaluation Command (ATEC): Yuma Proving Ground : Yuma, AZ	-	-		1.647	Nov 2021	1.000	Nov 2022	-		1.000	0.000	2.647	-
Supercharge FMR Testing	MIPR	Army Test & Evaluation Command (ATEC): Yuma Proving Ground : Yuma, AZ	-	-		0.400	May 2022	1.000	Nov 2022	-		1.000	0.000	1.400	-
		Subtotal	-	-		2.047		2.000		-		2.000	0.000	4.047	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		29.803		26.485		-		26.485	0.000	56.288	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

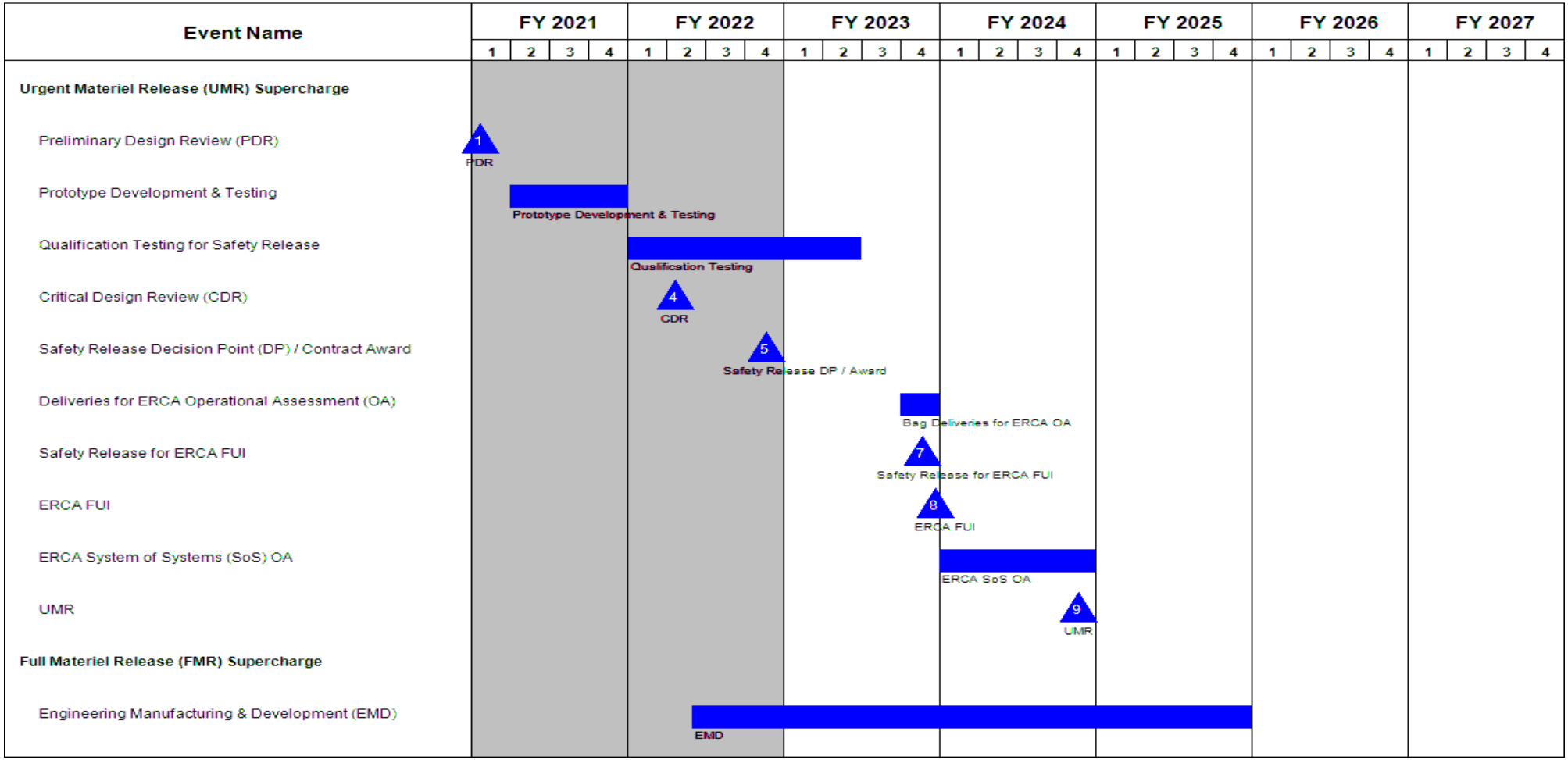
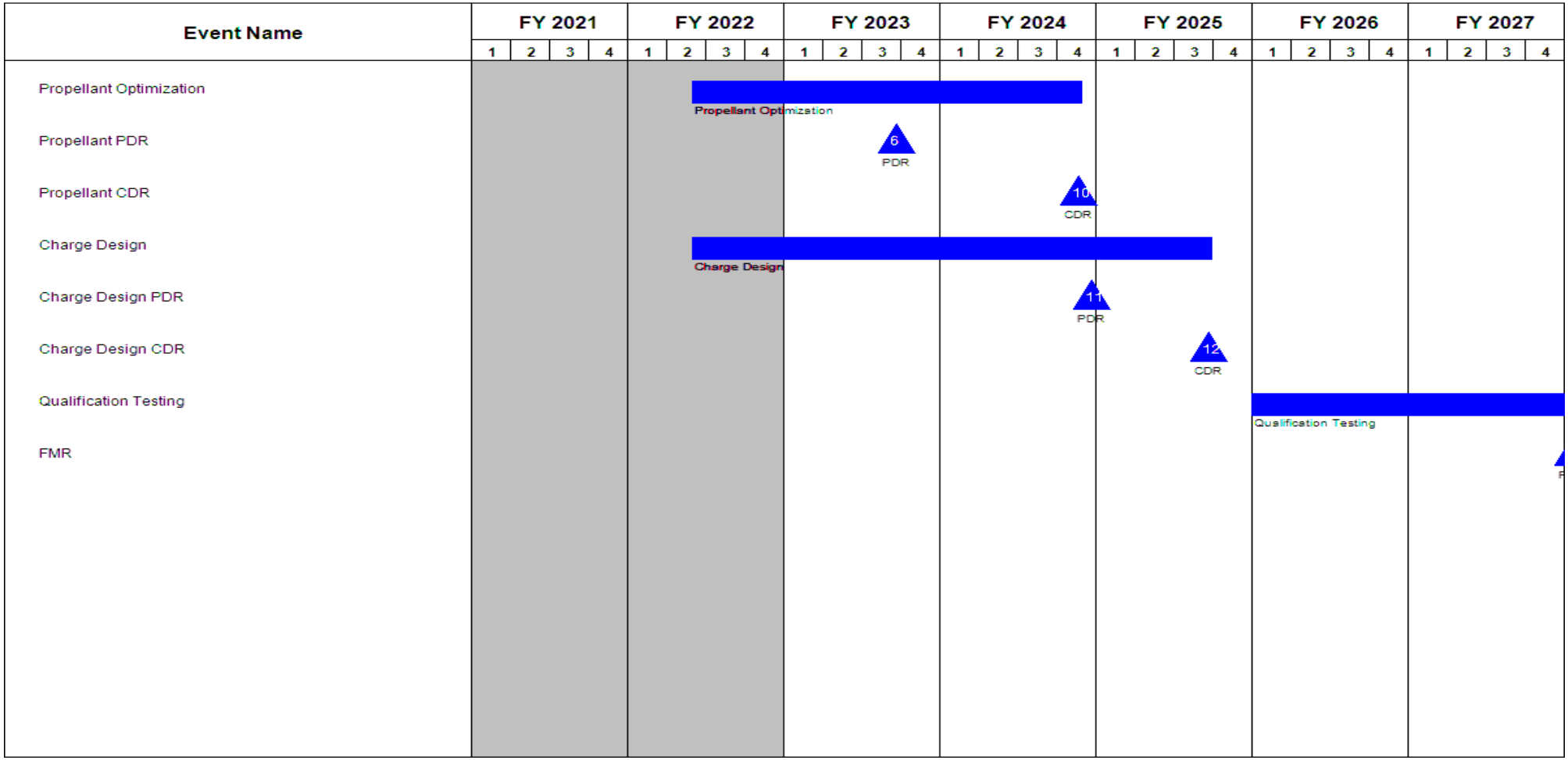


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*



Note

UMR Supercharge is pursuing a Safety Release to support ERCA System of Systems Operational Assessment. All Safety Release, UMR and FMR quantities will be procured with the associated Procurement of Ammunition, Army (PAA) funding.

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BQ3 / *155mm Artillery Propulsion XM654*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Urgent Materiel Release (UMR) Supercharge	1	2022	1	2022
Preliminary Design Review (PDR)	1	2021	1	2021
Prototype Development & Testing	1	2021	4	2021
Qualification Testing for Safety Release	1	2022	2	2023
Critical Design Review (CDR)	2	2022	2	2022
Safety Release Decision Point (DP) / Contract Award	4	2022	4	2022
Deliveries for ERCA Operational Assessment (OA)	4	2023	4	2023
Safety Release for ERCA FUI	4	2023	4	2023
ERCA FUI	4	2023	4	2023
ERCA System of Systems (SoS) OA	1	2024	4	2024
UMR	4	2024	4	2024
Full Materiel Release (FMR) Supercharge	1	2022	1	2022
Engineering Manufacturing & Development (EMD)	2	2022	4	2025
Propellant Optimization	2	2022	4	2024
Propellant PDR	3	2023	3	2023
Propellant CDR	4	2024	4	2024
Charge Design	2	2022	3	2025
Charge Design PDR	4	2024	4	2024
Charge Design CDR	3	2025	3	2025
Qualification Testing	1	2026	1	2028
FMR	1	2028	1	2028

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BY1 / *Next Generation Combat Vehicle Ammunition*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BY1: *Next Generation Combat Vehicle Ammunition*	-	22.176	33.867	33.778	-	33.778	34.747	6.547	-	-	0.000	131.115
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The total cost of the Next Generation Combat Vehicle Ammunition (NGCV) Middle Tier of Acquisition effort is $262.9 million from FY2019 to FY2027, including RDT&E ($128.337M) and Procurement ($134.532M). NGCV RDT&E and Procurement are fully funded across the Future Years Defense Program (FY2023-2027).

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) 2023 funding will support Design Engineering Test (DET) 2 for HEAB-T performance as well as Developmental Test and Evaluation (DT&E) for TP-T and APFSDS-T cartridges.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: 50x228mm Ammunition Development	22.176	32.631	33.778
Description: 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.			
FY 2022 Plans: Funding will support DET for all three cartridge types and subsequent design optimization. The TP-T cartridge 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.			
FY 2023 Plans: Funding will support DET2 for the APFSDS-T and HEAB-T cartridges for performance testing for support of CDR. Funding will also support the Developmental Test and Evaluation (DT&E) for the TP-T and APFSDS-T cartridges in support of Milestone C.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Increase in funding is planned lifecycle of the program and continues activities on all three cartridges in support of Milestone C.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	-	1.236	-
FY 2022 Plans: FY 2022 funding to be assessed per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A).			
FY 2022 to FY 2023 Increase/Decrease Statement: Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.			
Accomplishments/Planned Programs Subtotals	22.176	33.867	33.778

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E80011: *Next Generation Combat Vehicle Ammunition*	-	-	0.000	-	0.000	28.718	20.479	43.258	47.199	0.000	139.654

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 was awarded and will complete the rapid prototyping process. For TP-T two contractors were awarded and will complete rapid prototyping process. For HEAB-T, two contractors were 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BY1 / *Next Generation Combat Vehicle Ammunition*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	various : various	-	-		1.236	Mar 2022	-		-		-	0.000	1.236	-
		Subtotal	-	-		1.236		-		-		-	0.000	1.236	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	4.422	May 2022	0.412	Mar 2023	-		0.412	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	0.092	Mar 2023	-		0.092	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	0.240	Mar 2023	-		0.240	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	12.005	Mar 2023	-		12.005	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	12.005	Mar 2023	-		12.005	Continuing	Continuing	Continuing
		Subtotal	-	15.978		28.052		24.754		-		24.754	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) BY1 / *Next Generation Combat Vehicle Ammunition*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
50x228mm Ammo Engineering Support	MIPR	Development Command - Armaments Center (DEVCOM - AC) : Picatinny Arsenal, NJ	-	2.498	Dec 2020	3.080	Dec 2021	2.840	Dec 2022	-		2.840	Continuing	Continuing	Continuing
		Subtotal	-	2.498		3.080		2.840		-		2.840	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
50x228mm Design Engineering Testing	MIPR	Aberdeen Proving Ground (APG) : Aberdeen, MD	-	3.700	Jan 2021	1.499	Dec 2021	2.000	Dec 2022	-		2.000	Continuing	Continuing	Continuing
50x228mm Design Engineering Testing	MIPR	Yuma Proving Ground (YPG) : Yuma, AZ	-	-		-		1.184	Feb 2023	-		1.184	Continuing	Continuing	Continuing
50x228mm Developmental Test and Evaluation (DT&E)	MIPR	Aberdeen Proving Ground (APG) : Aberdeen, MD	-	-		-		3.000	Apr 2023	-		3.000	Continuing	Continuing	Continuing
		Subtotal	-	3.700		1.499		6.184		-		6.184	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	22.176		33.867		33.778		-		33.778	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

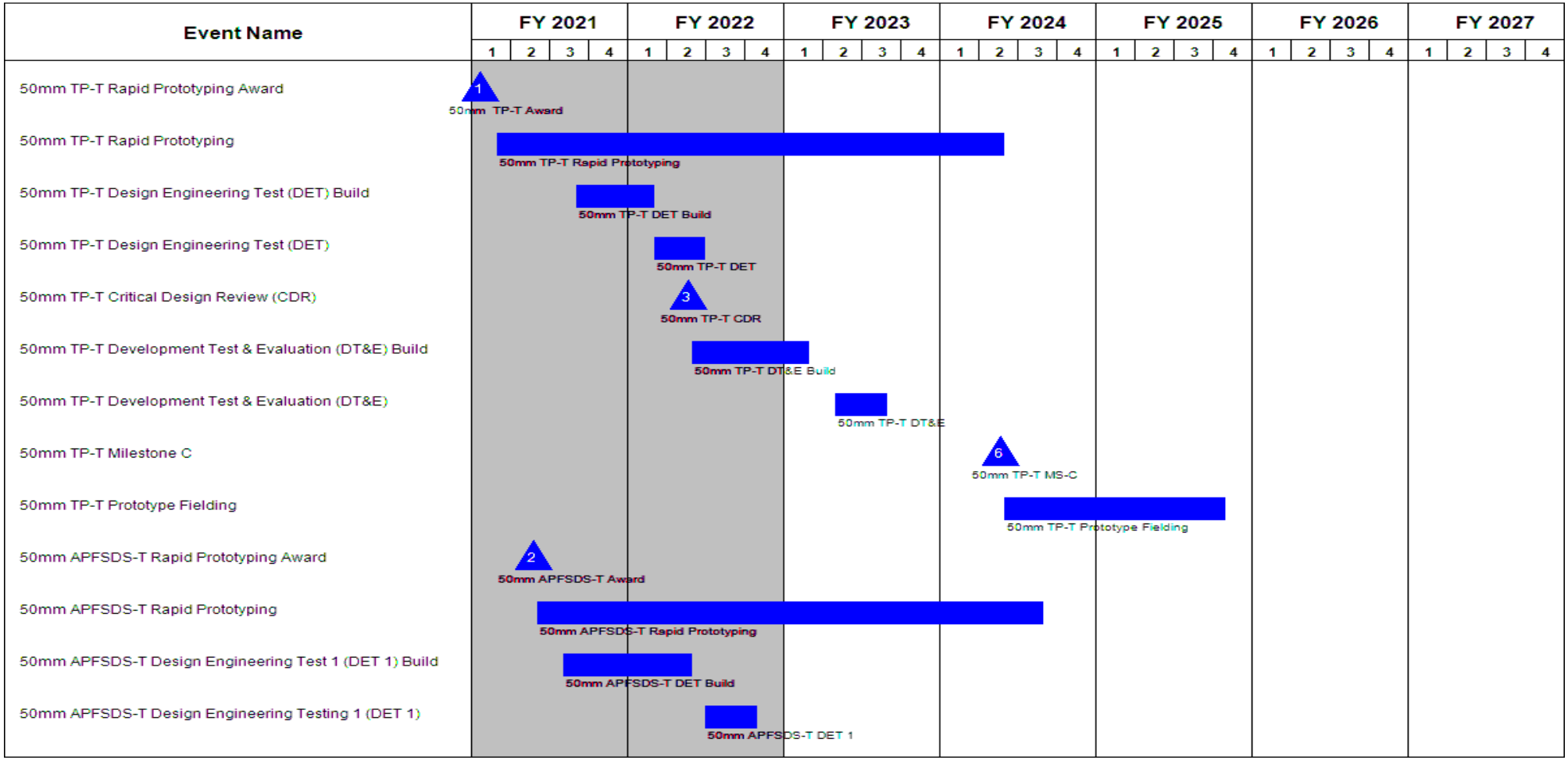


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

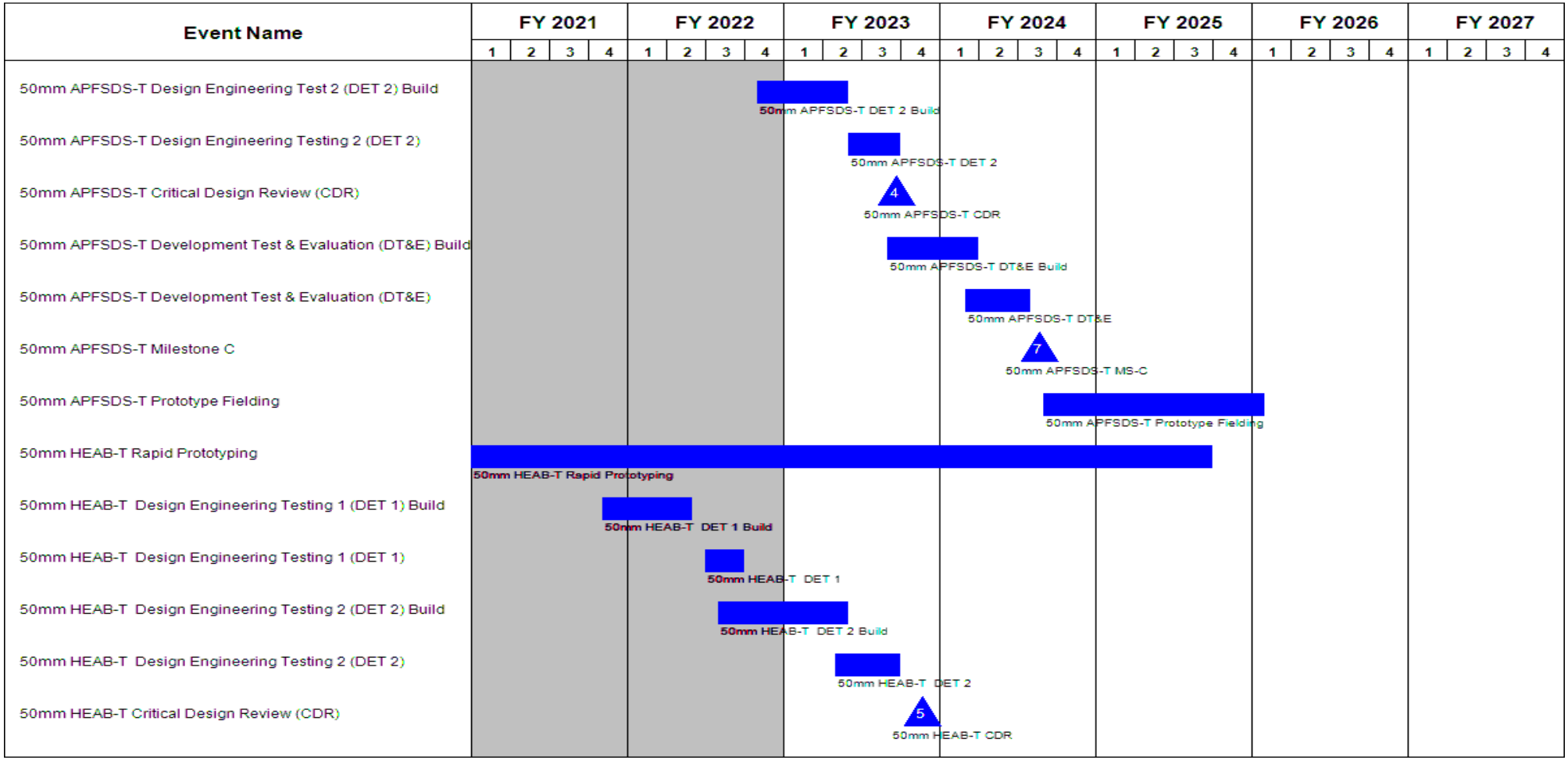


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

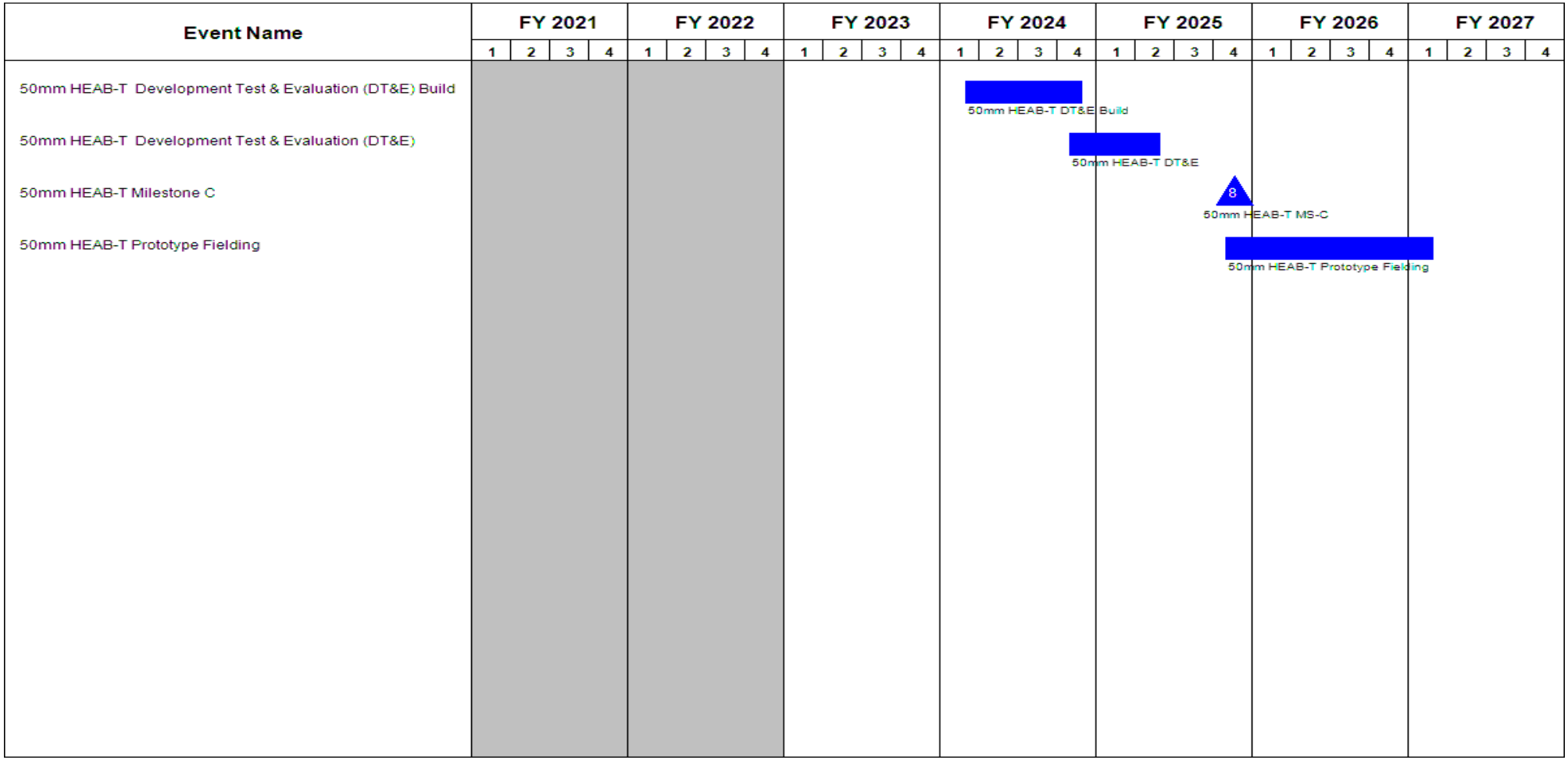


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

Schedule Details

	Start		End	
Events	**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 1 (DET 1) Build	3	2021	2	2022
50mm APFSDS-T Design Engineering Testing 1 (DET 1)	3	2022	4	2022
50mm APFSDS-T Design Engineering Test 2 (DET 2) Build	4	2022	2	2023
50mm APFSDS-T Design Engineering Testing 2 (DET 2)	2	2023	3	2023
50mm APFSDS-T Critical Design Review (CDR)	3	2023	3	2023
50mm APFSDS-T Development Test & Evaluation (DT&E) Build	3	2023	1	2024
50mm APFSDS-T Development Test & Evaluation (DT&E)	1	2024	3	2024
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

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** BY1 / *Next Generation Combat Vehicle Ammunition*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
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
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)

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) CE3 / *Precision Munition (Sniper)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
CE3: *Precision Munition (Sniper)*	-	-	9.275	5.182	-	5.182	-	-	-	-	0.000	14.457
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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) 2023 funding supports development of the AM munitions, evaluation of ammunition prototypes/concepts, and prototype build and testing. FY 2023 also supports evaluating industry/Government Subsonic and IPR munitions solutions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Develop and Improve Ammunition for Sniper Weapons Systems.	-	8.936	5.182
Description: 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. ***FY 2022 Plans:*** Commence development of the Anti-Materiel munitions; manufacture and evaluate prototype ammunition concepts. Commence development of the IPR munitions; manufacture and mature prototype ammunition designs. Evaluate and mature industry Subsonic Munitions prototype solutions and conduct safety testing. ***FY 2023 Plans:*** Continue development of the Anti-Materiel (AM) munitions; manufacture and evaluate prototype AM concepts. Continue evaluating and maturing industry and/or Government Subsonic Munitions and IPR prototype solutions. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease in funding is due to a focus on AM round prototype and test.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	-	0.339	-
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** CE3 / *Precision Munition (Sniper)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 funding to be assess per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.			
Accomplishments/Planned Programs Subtotals	-	9.275	5.182

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Precision Munition (Sniper) will utilize Other Transaction Authority (OTA) to acquire and/or mature current industry designs. Contracts to acquire parts and raw materials will be competitive. The Government will prototype and test projectiles.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) CE3 / *Precision Munition (Sniper)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	various : various	-	-		0.339		-		-		-	0.000	0.339	-
		Subtotal	-	-		0.339		-		-		-	0.000	0.339	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti-Materiel Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		3.336	Jun 2022	2.382	Feb 2023	-		2.382	Continuing	Continuing	Continuing
Improved Performance Round Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		0.500	Jun 2022	-		-		-	Continuing	Continuing	Continuing
Subsonic Development Contracts	C/CPFF	To Be Determined : To Be Determined	-	-		0.500	Jun 2022	-		-		-	Continuing	Continuing	Continuing
		Subtotal	-	-		4.336		2.382		-		2.382	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Anti-Materiel Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	-		1.600	May 2022	2.100	Oct 2022	-		2.100	Continuing	Continuing	Continuing
Improved Performance Round Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	-		0.500	May 2022	0.100	Oct 2022	-		0.100	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) CE3 / *Precision Munition (Sniper)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subsonic Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	-		0.500	May 2022	0.100	Oct 2022	-		0.100	Continuing	Continuing	Continuing
		Subtotal	-	-		2.600		2.300		-		2.300	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Lethality Testing and Analysis	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	-		2.000	Jun 2022	0.500	Oct 2022	-		0.500	Continuing	Continuing	Continuing
		Subtotal	-	-		2.000		0.500		-		0.500	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		9.275		5.182		-		5.182	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** CE3 / *Precision Munition (Sniper)*

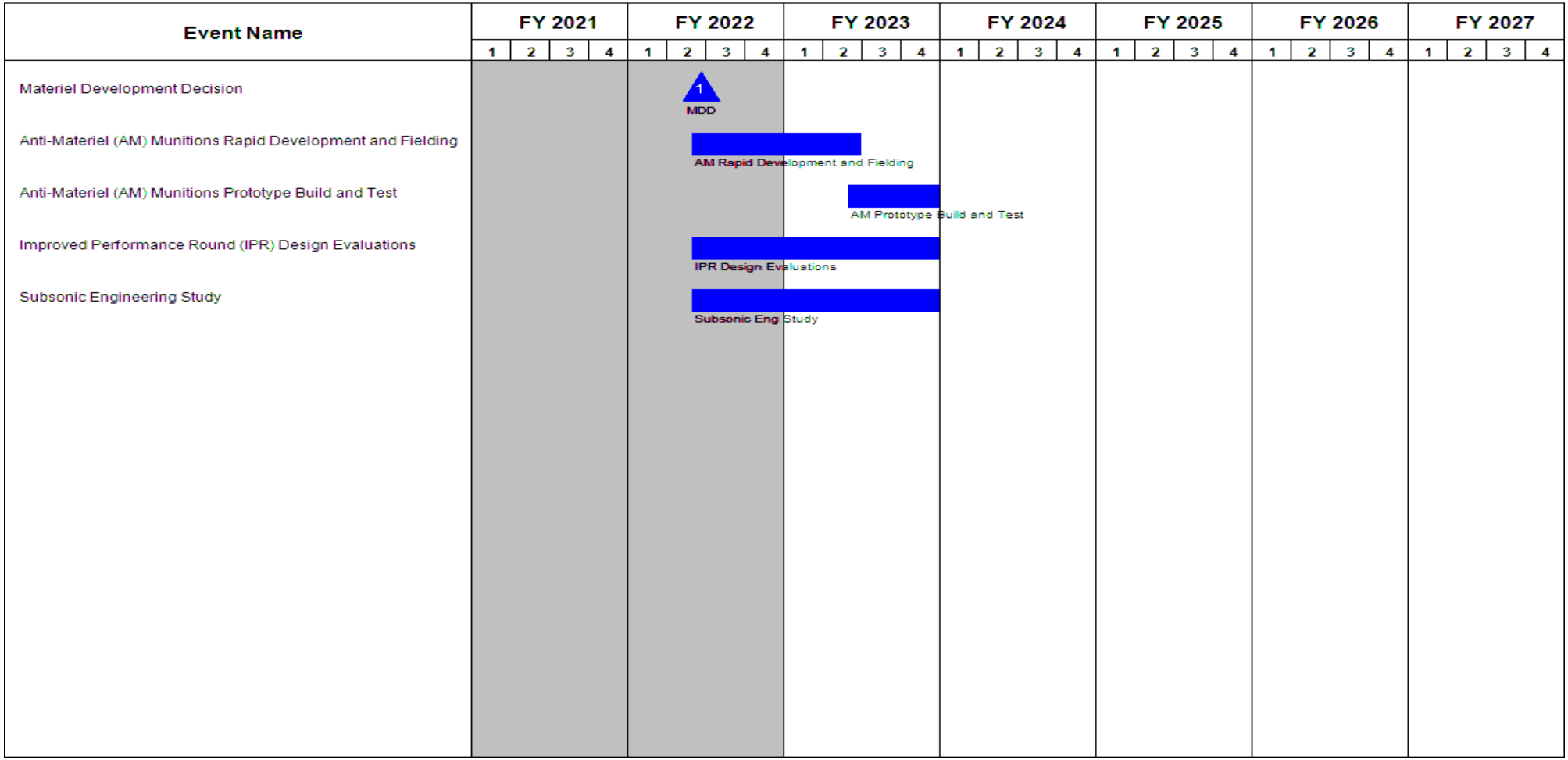


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** CE3 / *Precision Munition (Sniper)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Materiel Development Decision	2	2022	2	2022
Anti-Materiel (AM) Munitions Rapid Development and Fielding	2	2022	2	2023
Anti-Materiel (AM) Munitions Prototype Build and Test	2	2023	4	2023
Improved Performance Round (IPR) Design Evaluations	2	2022	4	2023
Subsonic Engineering Study	2	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EC4 / *Non-Standard Simulator Munitions*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EC4: *Non-Standard Simulator Munitions*	-	2.154	2.116	2.182	-	2.182	2.178	0.408	0.409	0.413	0.000	9.860
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 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; Macro Pyro to simulate hostile fire, booby trap and IED Simulations indoor and outdoors; 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; Antitank Guided Missile and Rocket (AGMR) simulator to replicate surface to air missile or shoulder launched rocket; 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 2023 funding will support the development of Yellow Smoke, RPG on a wire, Mini Blast, Tracer, and HiOBE.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Standardize Special Use Ammunition	2.154	2.038	2.182
Description: Standardize non-standard pyrotechnic battlefield effects currently used by CTCs.			
FY 2022 Plans: 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.			
FY 2023 Plans: This project will support Yellow Smoke and Mini Blast preparations to release the TC and FMR package. RPG will conduct qualification testing. The Tracer will be undergoing testing support activities and the HIOBE will continue EMD activities.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding increase due to increased qualification testing requirements.			
Title: FY22 SBIR/STTR Transfer	-	0.078	-
FY 2022 Plans: Funding transferred in accordance with Title 15 USC ?638			
FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	2.154	2.116	2.182

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E88404: *SIMULATORS, Non-Standard, Special Effects, f/CTCs*	-	0.108	0.296	-	0.296	0.296	0.297	0.296	0.297	0.000	1.590

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/ Antitank Guided Missile and Rocket (AGMR), and Black Smoke simulators followed by additional training simulators as required in the Future Army System of Integrated Targets (FASIT) Capability Production Document (CPD).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EC4 / *Non-Standard Simulator Munitions*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY22 SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.078		-		-		-	0.000	0.078	-
		Subtotal	-	-		0.078		-		-		-	0.000	0.078	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HiOBE Developmental Hardware	C/FFP	TBD : TBD	-	-		-		0.015	Jun 2023	-		0.015	0.000	0.015	-
Tracer Qualification Hardware	C/FFP	SAIC : Reston, VA	-	-		0.418	Apr 2022	0.591	Mar 2023	-		0.591	0.000	1.009	-
RPG/Mini Blast Prototype Build	C/FFP	SAIC : Reston, VA	-	0.365	Jan 2022	-		-		-		-	0.000	0.365	-
Yellow Smoke Qualification Hardware	C/FFP	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.776	Jul 2021	-		-		-		-	0.000	0.776	-
Plastic Mold Development	C/FFP	Augustine Die & Mold : Somerset, PA	-	0.434	Dec 2021	-		-		-		-	0.000	0.434	-
Product Development	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	3.506	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	3.506	1.575		0.418		0.606		-		0.606	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	3.791	0.404	Mar 2021	1.245	May 2022	1.219	Oct 2022	-		1.219	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EC4 / *Non-Standard Simulator Munitions*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-		-		-		-		-	0.000	0.024	-
Document Development Support	SS/FFP	Booz Allen Hamilton : Picatinny Arsenal, NJ	-	0.133	Apr 2021	-		-		-		-	0.000	0.133	-
		Subtotal	3.815	0.579		1.245		1.219		-		1.219	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracer EMQ Qualification	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.057	Jul 2023	-		0.057	0.000	0.057	-
RPG on a Wire Qualification Testing	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		-		0.300	May 2022	-		0.300	0.000	0.300	-
Mini Blast Qualification Testing	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		0.300	Sep 2022	-		-		-	0.000	0.300	-
Yellow Smoke Qualification Testing	MIPR	Naval Surface Warfare Center : Dahlgren, VA	-	-		0.075	Sep 2022	-		-		-	0.000	0.075	-
		Subtotal	-	-		0.375		0.357		-		0.357	0.000	0.732	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EC4 / *Non-Standard Simulator Munitions*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.321	2.154		2.116		2.182		-		2.182	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

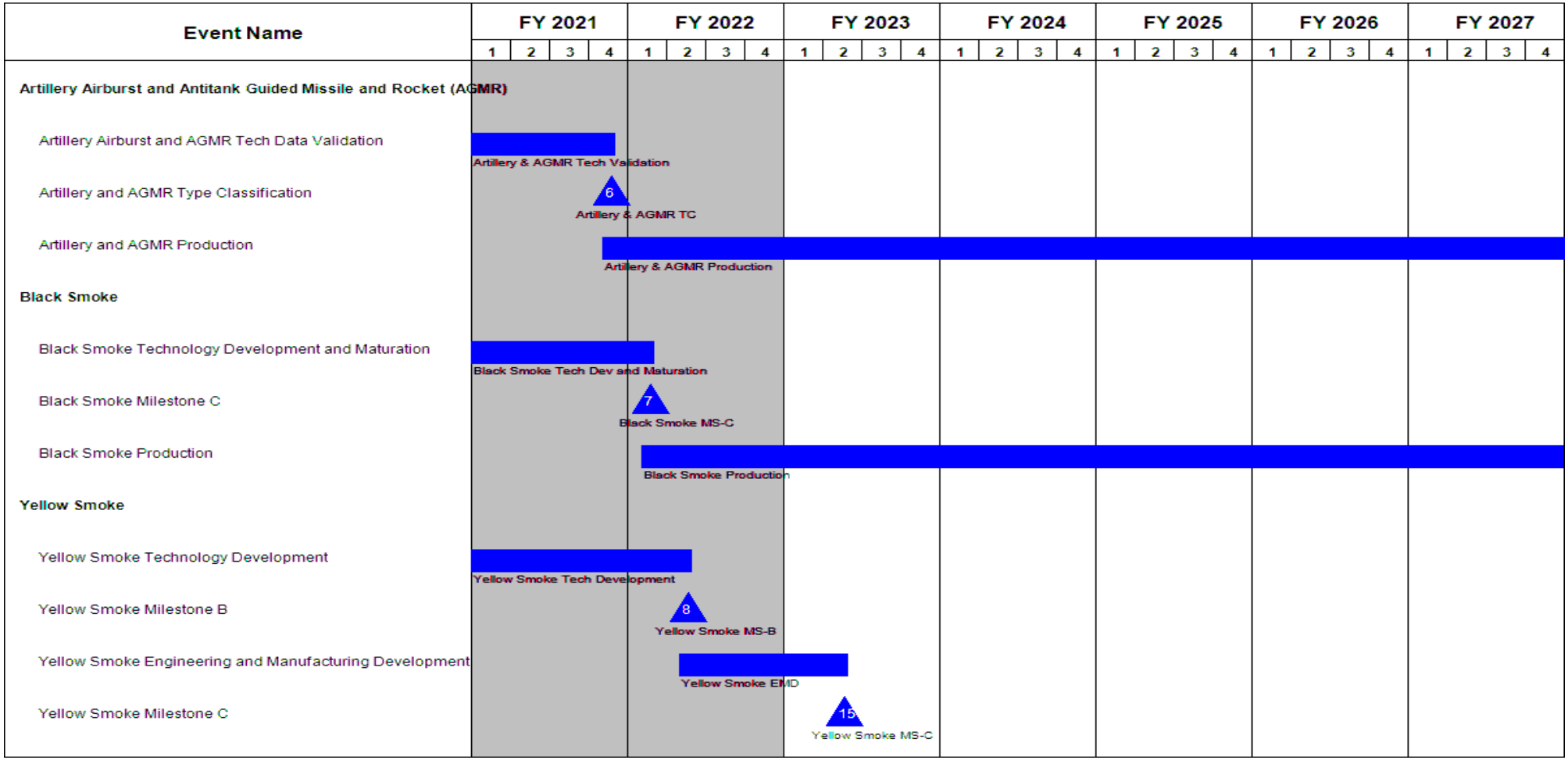


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

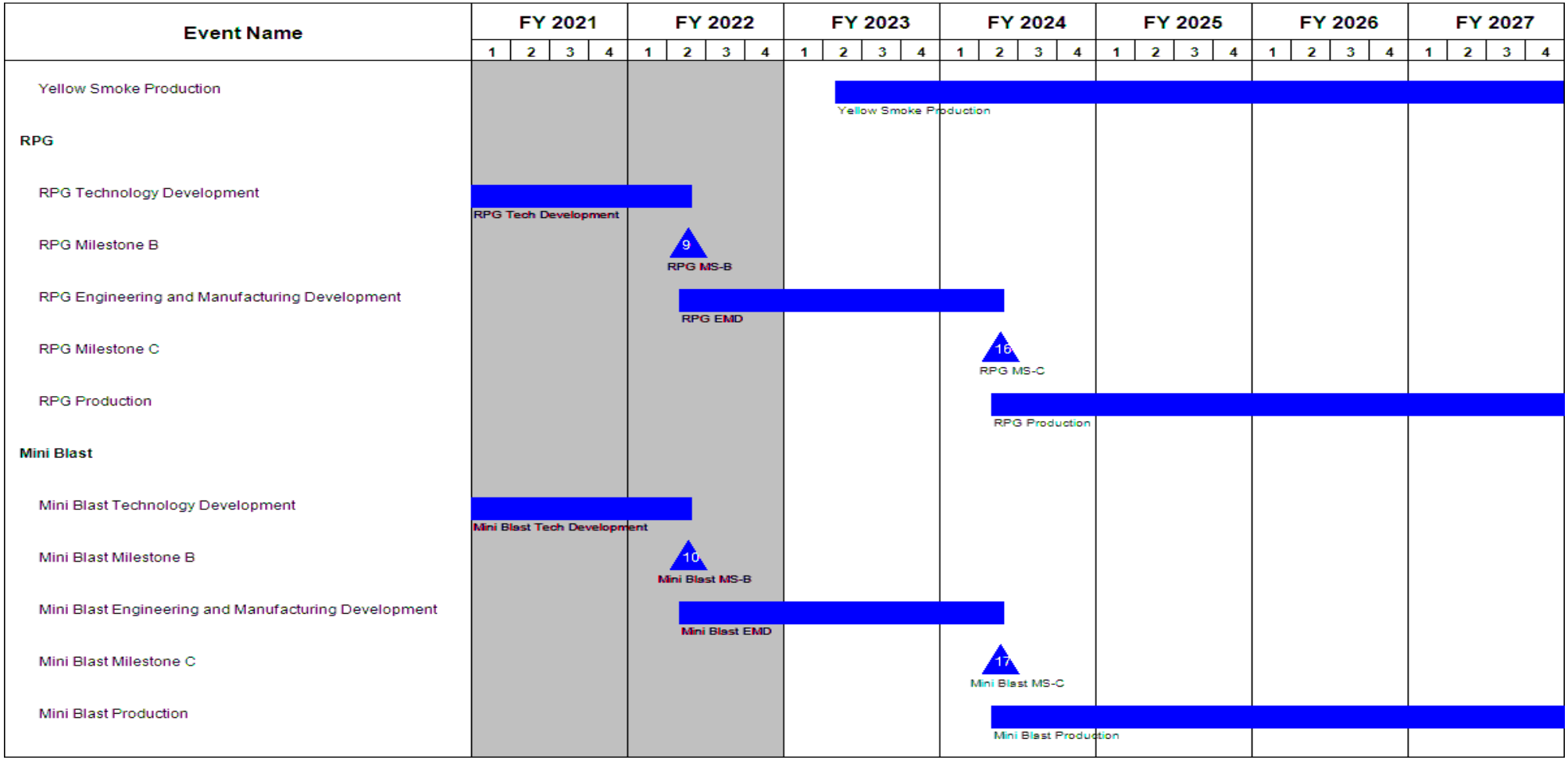


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

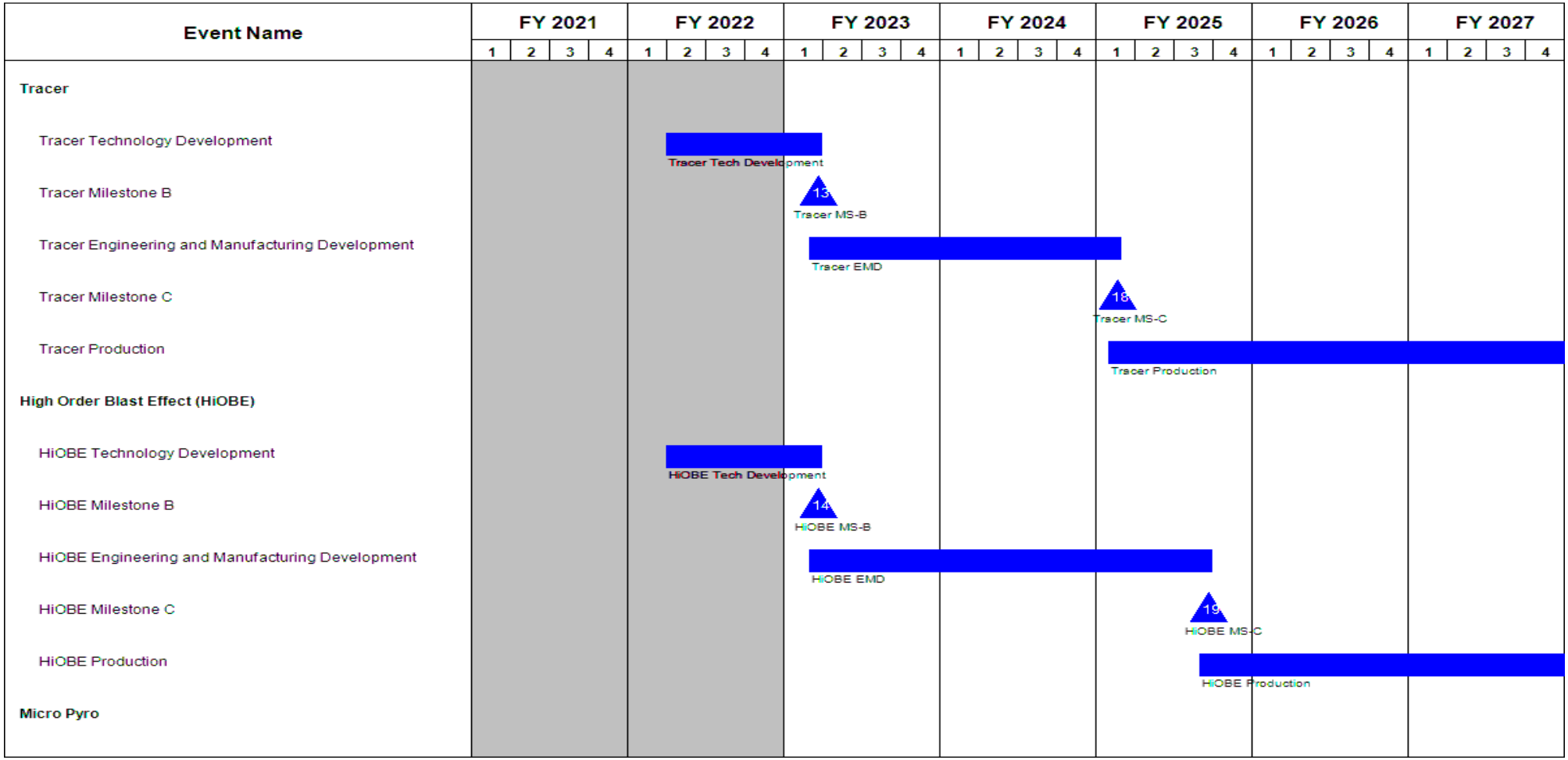


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

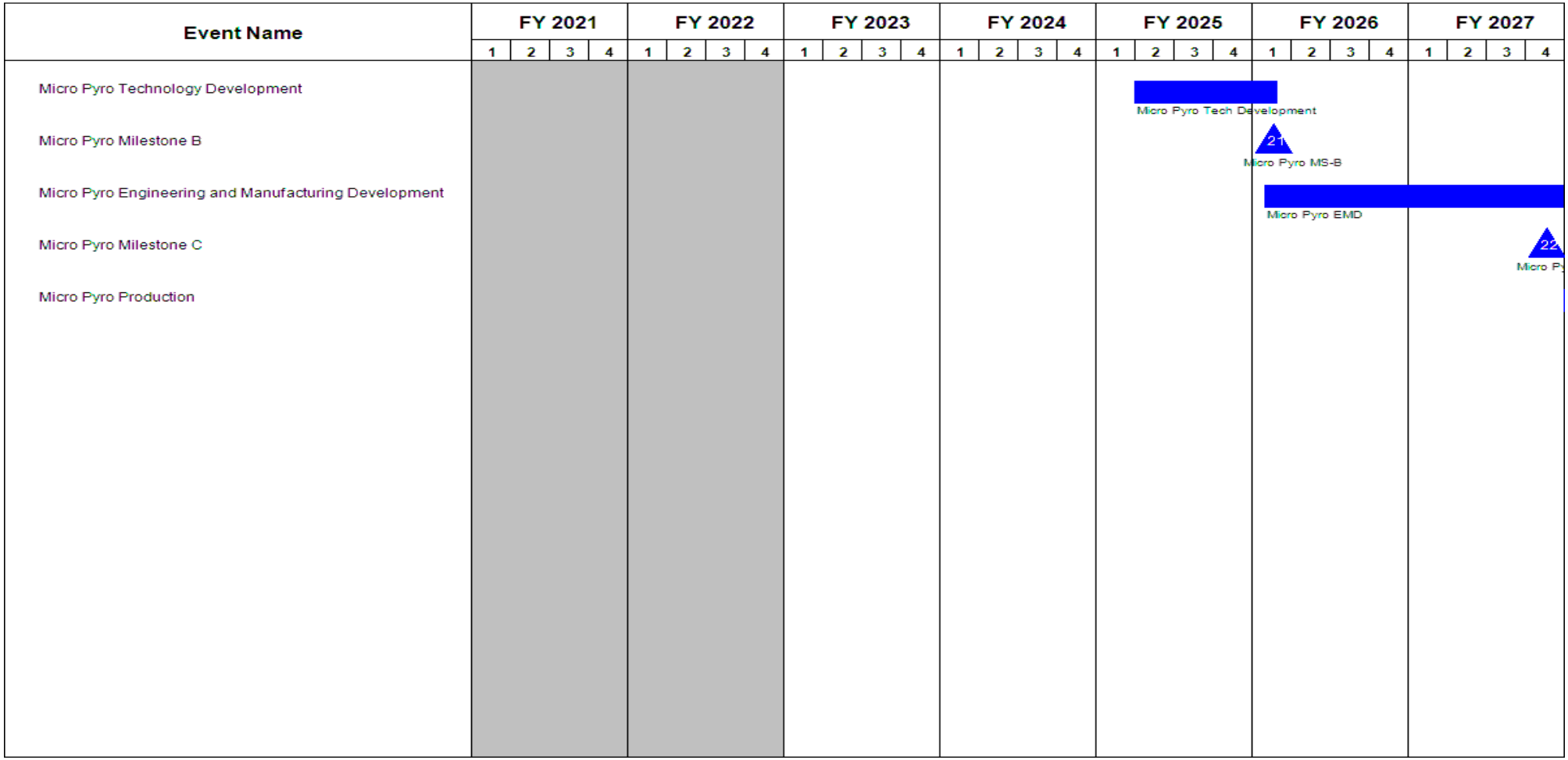


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Artillery Airburst and Antitank Guided Missile and Rocket (AGMR)	4	2021	4	2021
Artillery Airburst and AGMR Tech Data Validation	4	2019	4	2021
Artillery and AGMR Type Classification	4	2021	4	2021
Artillery and AGMR Production	4	2021	4	2028
Black Smoke	4	2021	4	2021
Black Smoke Technology Development and Maturation	4	2019	1	2022
Black Smoke Milestone C	1	2022	1	2022
Black Smoke Production	1	2022	4	2027
Yellow Smoke	4	2021	4	2021
Yellow Smoke Technology Development	2	2020	2	2022
Yellow Smoke Milestone B	2	2022	2	2022
Yellow Smoke Engineering and Manufacturing Development	2	2022	2	2023
Yellow Smoke Milestone C	2	2023	2	2023
Yellow Smoke Production	2	2023	4	2027
RPG	4	2021	4	2021
RPG Technology Development	2	2020	2	2022
RPG Milestone B	2	2022	2	2022
RPG Engineering and Manufacturing Development	2	2022	2	2024
RPG Milestone C	2	2024	2	2024
RPG Production	2	2024	4	2028
Mini Blast	4	2021	4	2021
Mini Blast Technology Development	2	2020	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EC4 / *Non-Standard Simulator Munitions*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Mini Blast Milestone B	2	2022	2	2022
Mini Blast Engineering and Manufacturing Development	2	2022	2	2024
Mini Blast Milestone C	2	2024	2	2024
Mini Blast Production	2	2024	4	2028
Tracer	4	2022	4	2022
Tracer Technology Development	2	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	2	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	2026	1	2026
Micro Pyro Technology Development	2	2025	1	2026
Micro Pyro Milestone B	1	2026	1	2026
Micro Pyro Engineering and Manufacturing Development	1	2026	4	2027
Micro Pyro Milestone C	4	2027	4	2027
Micro Pyro Production	1	2028	4	2034

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EL9 / *Ammunitions Logistics Prototyping*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EL9: *Ammunitions Logistics Prototyping*	-	1.639	0.696	1.022	-	1.022	1.047	1.066	1.067	1.077	0.000	7.614
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) 2023 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)	FY 2021	FY 2022	FY 2023
Title: Munitions Survivability and Logistics Enablers	1.639	0.671	1.022
Description: This program will develop ammunition logistics systems that improve munitions survivability and logistics			
FY 2022 Plans: 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.			
FY 2023 Plans: Assess the JPEO A&A portfolio for transition opportunities for munitions health monitoring prototypes that have been validated to a Technical Readiness Level (TRL) 6 maturity. Mature and/or develop previously investigated prototype systems focused on tactical Cannon Artillery operations that will improve the operational availability of ammunition and associated components at the tactical edge. The systems will ensure artillery ammunition is prepared, protected, and monitored prior to use to improve the security and survivability of the ammunition supply chain.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EL9 / *Ammunitions Logistics Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding increase due to expected Q4 FY22 availability of prototypes ready to transition to PM in FY23.			
Title: SBIR/STTR Transfer	-	0.025	-
FY 2022 Plans: Funding transferred in accordance with Title 15 USC ?638			
FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638			
Accomplishments/Planned Programs Subtotals	1.639	0.696	1.022

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EL9 / *Ammunitions Logistics Prototyping*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.025		-		-		-	0.000	0.025	-
		Subtotal	-	-		0.025		-		-		-	0.000	0.025	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor	C/FFP	Karagozian & Case : Glendale, CA	1.984	0.367	Jan 2021	-		-		-		-	0.000	2.351	-
Contractor	C/FFP	Phase IV : Boulder, CO	0.460	-		-		-		-		-	0.000	0.460	-
Contractor	C/TBD	TBD : TBD	-	-		0.475	Jan 2022	0.822	Jan 2023	-		0.822	0.000	1.297	-
Contractor	C/FFP	AGM : Tuscon, AZ	0.856	0.466	May 2021	-		-		-		-	0.000	1.322	-
Contractor	C/FFP	Stevens Institute of Technology : Hoboken, NJ	0.167	0.150	Jul 2021	-		-		-		-	0.000	0.317	-
Contractor	C/FFP	Mide Tech Corp : Woburn, MA	0.203	0.168	Jun 2021	-		-		-		-	0.000	0.371	-
		Subtotal	3.670	1.151		0.475		0.822		-		0.822	0.000	6.118	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Capabilities Development Command, Armaments Center (CCDC, AC)	MIPR	Picatinny Arsenal : NJ	1.033	0.488	Dec 2020	0.196	Oct 2021	0.200	Mar 2023	-		0.200	0.000	1.917	-
		Subtotal	1.033	0.488		0.196		0.200		-		0.200	0.000	1.917	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EL9 / *Ammunitions Logistics Prototyping*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.703	1.639		0.696		1.022		-		1.022	0.000	8.060	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EL9 / *Ammunitions Logistics Prototyping*

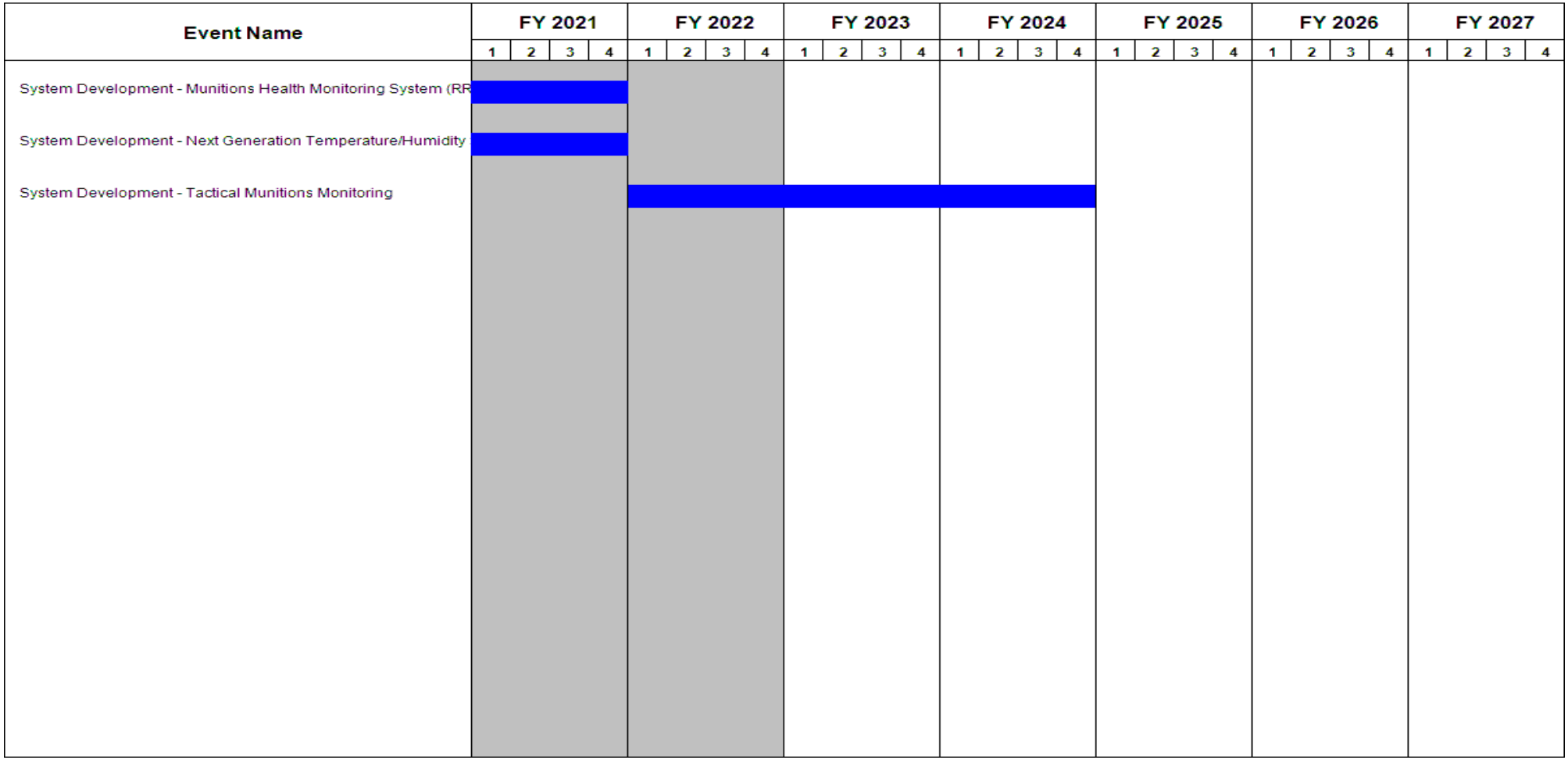


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EL9 / *Ammunitions Logistics Prototyping*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
System Development - Munitions Health Monitoring System (RRAPDS)	2	2018	4	2021
System Development - Next Generation Temperature/Humidity Sensor	3	2020	4	2021
System Development - Tactical Munitions Monitoring	1	2022	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP2 / *Shoulder-Launched Munitions*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EP2: *Shoulder-Launched Munitions*	-	10.011	0.987	-	-	-	-	-	-	-	0.000	10.998
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Individual Assault Munition (IAM) system consists of the tactical XM919 and training devices including the XM922 sub-caliber trainer. The XM919 IAM will be a lightweight Shoulder Launched Munition (SLM) capability for combat units at the individual Soldier level. The IAM training devices including the XM922 sub-caliber trainer provide training capability that will increase the Soldier's proficiency and integration of the XM919 tactical system into combat operations. 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 tactical 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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: XM919 Individual Assault Munition (IAM)	10.011	0.951	-
Description: 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. ***FY 2022 Plans:*** FY 2022 funding will support the completion of testing, execution of a Soldier touch point, development of test reports and documentation for contract award and Milestone C decision ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease is based on a projected decline in requirements in FY 2023.			
Title: FY22 SBIR/STTR	-	0.036	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP2 / *Shoulder-Launched Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: FY22 Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)			
FY 2022 to FY 2023 Increase/Decrease Statement: FY22 Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)			
Accomplishments/Planned Programs Subtotals	10.011	0.987	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The 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 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 tactical XM919 IAM will replace the AT4CS-RS and BDM shoulder launched munition systems. The IAM training devices including the XM922 sub-caliber trainer will replace AT4CS-RS and BDM training devices.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP2 / *Shoulder-Launched Munitions*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY22 SBIR/STTR	TBD	TBD : TBD	-	-		0.036		-		-		-	0.000	0.036	-
		Subtotal	-	-		0.036		-		-		-	0.000	0.036	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Individual Assault Munition (IAM) Hardware 1	C/FFP	SAAB : Stockholm, Sweden	0.593	0.571	Jan 2021	-		-		-		-	0.000	1.164	-
Individual Assault Munition (IAM) Hardware 2	C/FFP	Dynamit Nobel Defense : Burbach, Germany	1.120	0.816	Jan 2021	-		-		-		-	0.000	1.936	-
Individual Assault Munition (IAM) Trainer 1	C/FFP	Dynamit Nobel Defense : Burbach, Germany	-	0.193	Jun 2021	-		-		-		-	0.000	0.193	-
		Subtotal	1.713	1.580		-		-		-		-	0.000	3.293	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tactical Engineering Support - Gov	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.890	3.239	Feb 2021	0.755	May 2022	-		-		-	0.000	4.884	-
Trainer Engineering Support - Gov	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.054	Feb 2021	0.146	May 2022	-		-		-	0.000	0.200	-
Engineering Support - Contract	C/CPFF	Booz Allen Hamilton : McLean, VA	-	0.631	Dec 2020	-		-		-		-	0.000	0.631	-
Engineering Support - Gov	MIPR	TACOM : Warren, MI	-	0.036	Dec 2021	0.050	May 2022	-		-		-	0.000	0.086	-
		Subtotal	0.890	3.960		0.951		-		-		-	0.000	5.801	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP2 / *Shoulder-Launched Munitions*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tactical Evaluation Test and Targets	MIPR	Various : Various	1.328	3.658	Feb 2021	-		-		-		-	0.000	4.986	-
Modeling and Simulation	MIPR	DEVCOM Data Analysis Center : Aberdeen, MD	-	0.613	Feb 2021	-		-		-		-	0.000	0.613	-
Environmental Testing	MIPR	Aberdeen Test Center : Aberdeen Proving Ground (APG)	-	0.200	Aug 2022	-		-		-		-	0.000	0.200	-
		Subtotal	1.328	4.471		-		-		-		-	0.000	5.799	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.931	10.011		0.987		-		-		-	0.000	14.929	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP2 / *Shoulder-Launched Munitions*

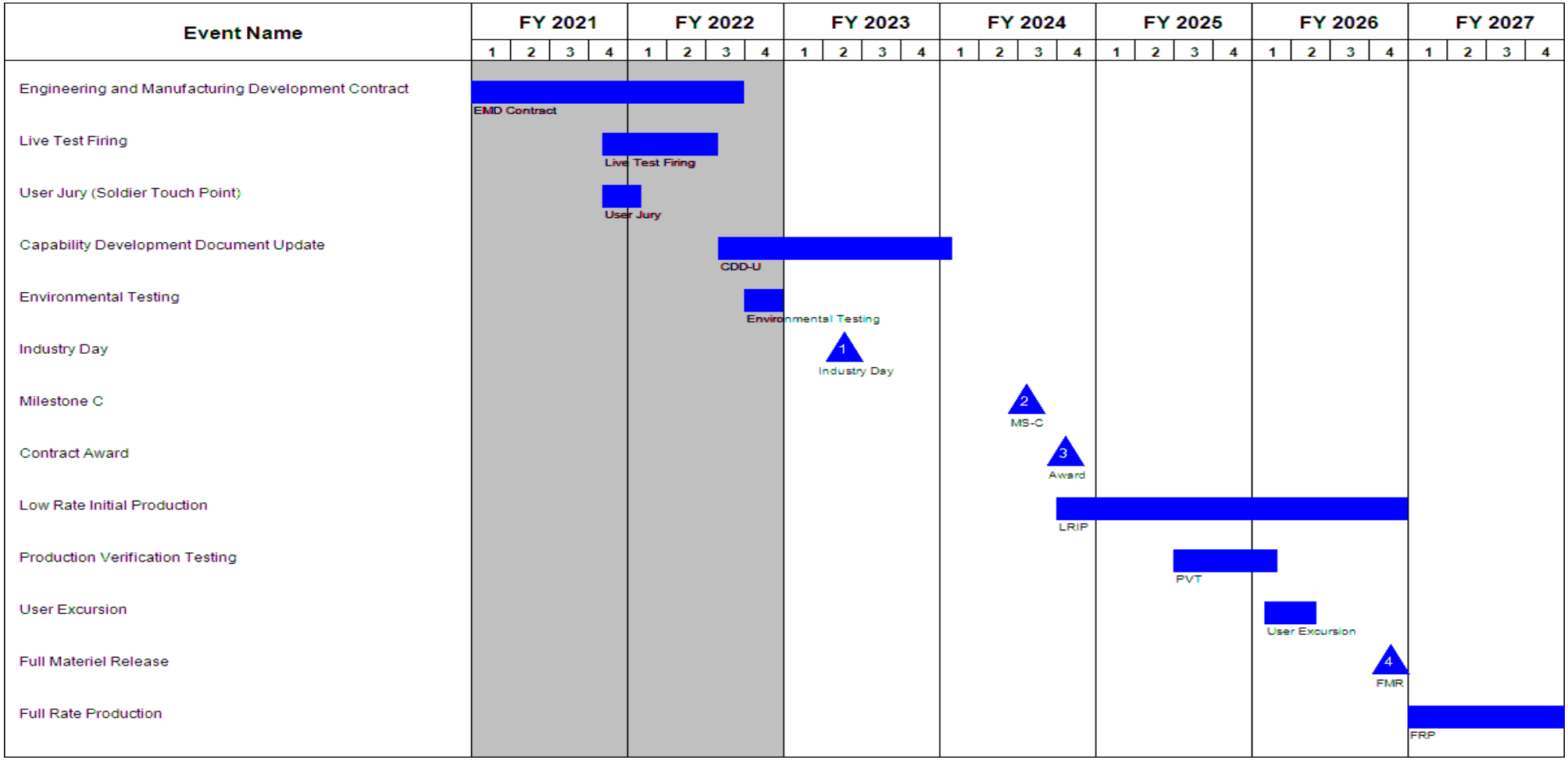


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP2 / *Shoulder-Launched Munitions*

Schedule Details

	Start		End	
Events	**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	3	2022
User Jury (Soldier Touch Point)	4	2021	1	2022
Capability Development Document Update	3	2022	1	2024
Environmental Testing	4	2022	4	2022
Industry Day	2	2023	2	2023
Milestone C	3	2024	3	2024
Contract Award	4	2024	4	2024
Low Rate Initial Production	4	2024	4	2026
Production Verification Testing	3	2025	1	2026
User Excursion	1	2026	2	2026
Full Materiel Release	4	2026	4	2026
Full Rate Production	1	2027	1	2033

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP3 / *Reduced Range Ammunition - Small Caliber*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EP3: *Reduced Range Ammunition - Small Caliber*	-	13.816	11.150	5.214	-	5.214	-	-	-	-	0.000	30.180
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) 2023 funding supports completing Engineering and Manufacturing Development (EMD) efforts, completing 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 2023 also includes completing the EMD effort, complete safety release testing, conducting a Limited User Assessment (LUA) / User Evaluation, and completing PQT on the .50 caliber variant.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Engineering and Manufacturing Development 7.62mm ***Description:*** EMD Activities for 7.62mm Reduced Range Ammunition. ***FY 2022 Plans:*** Complete EMD, conduct PQT, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for Low-Rate Initial Production (LRIP). ***FY 2023 Plans:*** Complete EMD, complete PQT, and continue performing activities to prepare for transition of manufacturing to the LCAAP in preparation for Low-Rate Initial Production (LRIP). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funds were reduced in accordance with planned EMD activities in FY 2023.	5.816	6.193	1.800
Title: Engineering and Manufacturing Development .50 Caliber ***Description:*** EMD Activities for .50 Cal Reduced Range Ammunition. ***FY 2022 Plans:***	8.000	4.550	3.414

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Continue the EMD effort, conduct safety release testing, conduct a LUA, and prepare for PQT. ***FY 2023 Plans:*** Complete EMD effort, complete safety release testing, complete PQT, and conduct a LUA. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funds were reduced in accordance with planned EMD activities in FY 2023.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) ***FY 2022 Plans:*** FY 2022 funding to be assess per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.	-	0.407	-
Accomplishments/Planned Programs Subtotals	13.816	11.150	5.214

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP3 / *Reduced Range Ammunition - Small Caliber*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	various : various	-	-		0.407		-		-		-	0.000	0.407	-
		Subtotal	-	-		0.407		-		-		-	0.000	0.407	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Contract 7.62mm EMD # 1	Option/ CPFF	General Dynamics : St. Petersburg, Florida	1.916	1.500	Feb 2021	-		-		-		-	Continuing	Continuing	Continuing
Development Contract 7.62mm EMD # 2	Option/ CPFF	Nammo Tally : Mesa, Arizona	1.413	1.600	Feb 2021	0.519	Jun 2022	-		-		-	Continuing	Continuing	Continuing
Development Contract 7.62mm Transition to Lake City Army Ammunition Plant (LCAAP)	Option/ CPFF	OLIN Winchester Corporation : Independence, Missouri	0.509	-		1.824	Jun 2022	-		-		-	0.000	2.333	-
Development Contract .50 Cal Contractor 1	Option/ CPFF	General Dynamics : General Dynamics	0.352	1.510	Mar 2021	-		0.615	Jan 2023	-		0.615	Continuing	Continuing	Continuing
Development Contract .50 cal Contractor 2	Option/ CPFF	Nammo Talley : Mesa, Arizona	-	1.510	Mar 2021	-		-		-		-	0.000	1.510	-
Prototype Development	Option/ CPAF	Booz Allen Hamilton : Dover, NJ	0.390	-		-		-		-		-	0.000	0.390	-
		Subtotal	4.580	6.120		2.343		0.615		-		0.615	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DEVCOM-AC Engineering Support 7.62mm	MIPR	Development Command Armaments Center (DEVCOM-AC) :	2.697	1.616	Oct 2020	0.800	Oct 2021	1.183	Oct 2022	-		1.183	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP3 / *Reduced Range Ammunition - Small Caliber*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Picatinny Arsenal, New Jersey													
DEVCOM-AC Engineering Support .50 Cal	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	1.050	1.640	Nov 2020	1.400	Oct 2021	1.200	Oct 2022	-		1.200	Continuing	Continuing	Continuing
US Army Research Lab (ARL) 7.62mm	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	0.270	0.200		0.700	Feb 2022	0.400	Oct 2022	-		0.400	Continuing	Continuing	Continuing
US Army Research Lab (ARL) .50 Cal	MIPR	US Army Research Lab (ARL) : Aberdeen, Maryland	-	0.400	Feb 2021	0.800	Feb 2022	0.301	Oct 2022	-		0.301	Continuing	Continuing	Continuing
		Subtotal	4.017	3.856		3.700		3.084		-		3.084	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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 LUA	MIPR	U.S. Army Test Center : Aberdeen, Maryland	-	0.400	Oct 2020	0.600	Jun 2022	-		-		-	0.000	1.000	-
Pre-Production Qualification Testing (PPQT 7.62mm)	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	1.600	Dec 2020	-		-		-		-	Continuing	Continuing	Continuing
Production Qualification Testing (PQT 7.62mm)	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		1.750	Jun 2022	0.300	Nov 2022	-		0.300	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP3 / *Reduced Range Ammunition - Small Caliber*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Pre-Production Qualification Testing (PPQT) .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	0.800	Nov 2020	-		-		-		-	0.000	0.800	-
User Evaluation .50 Cal	MIPR	Maneuver Battle Labs : Fort Benning, Georgia	-	0.640	Oct 2020	0.600	Jun 2022	0.415	Dec 2022	-		0.415	Continuing	Continuing	Continuing
Engineering Tests .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	0.658	0.400	Oct 2020	-		-		-		-	Continuing	Continuing	Continuing
Production Qualification Testing (PQT) .50 Cal	MIPR	Aberdeen Test Center : Aberdeen, Maryland	-	-		1.750	Jun 2022	0.800	Nov 2022	-		0.800	Continuing	Continuing	Continuing
		Subtotal	1.140	3.840		4.700		1.515		-		1.515	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9.737	13.816		11.150		5.214		-		5.214	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

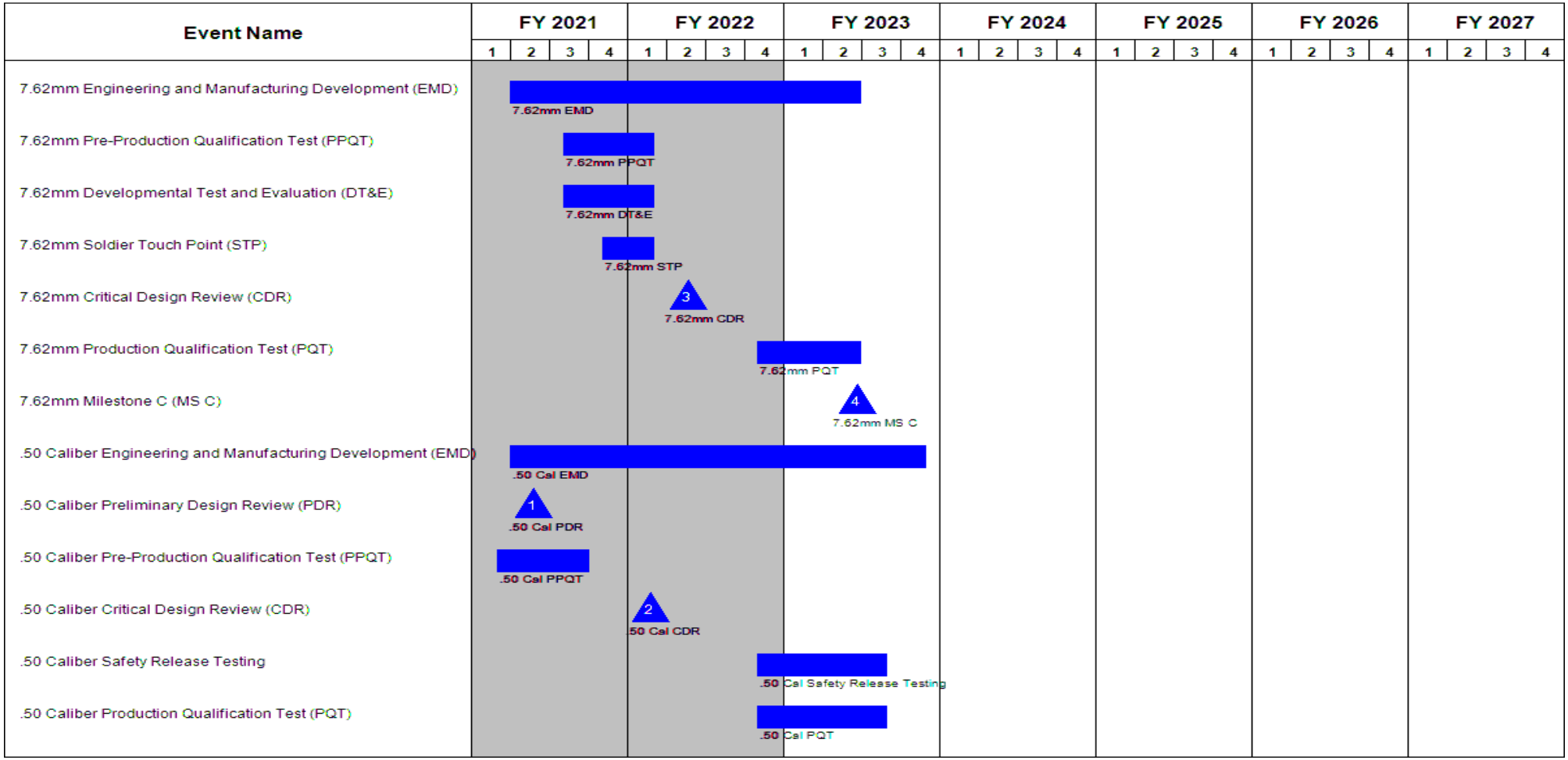


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

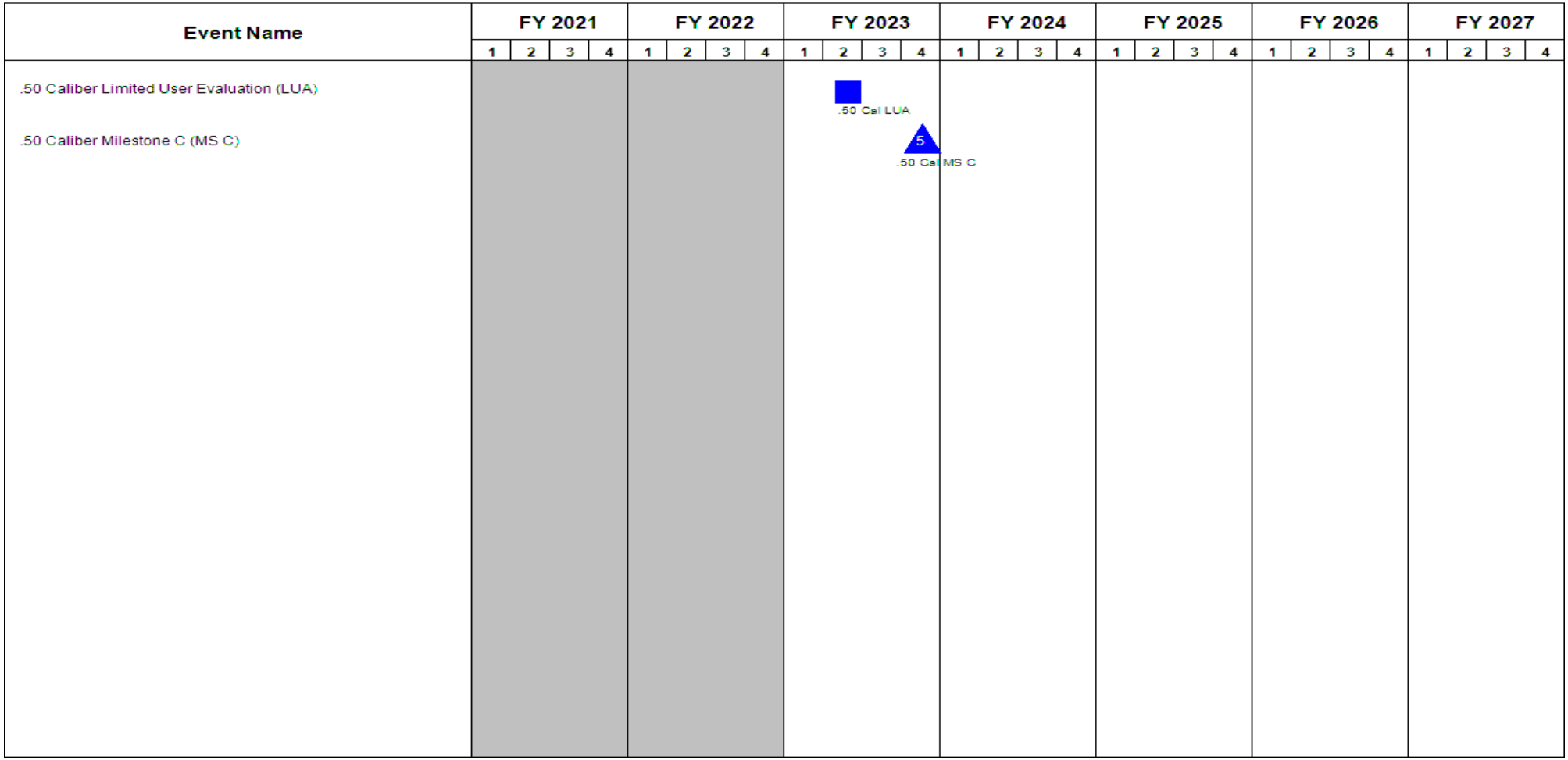


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

Schedule Details

	Start		End	
Events	**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	2	2023
7.62mm Preliminary Design Review (PDR)	2	2020	2	2020
7.62mm Pre-Production Qualification Test (PPQT)	3	2021	1	2022
7.62mm Developmental Test and Evaluation (DT&E)	3	2021	1	2022
7.62mm Soldier Touch Point (STP)	4	2021	1	2022
7.62mm Critical Design Review (CDR)	2	2022	2	2022
7.62mm Production Qualification Test (PQT)	4	2022	2	2023
7.62mm Milestone C (MS C)	2	2023	2	2023
.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	4	2023
.50 Caliber Preliminary Design Review (PDR)	2	2021	2	2021
.50 Caliber Pre-Production Qualification Test (PPQT)	1	2021	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP3 / *Reduced Range Ammunition - Small Caliber*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
.50 Caliber Critical Design Review (CDR)	1	2022	1	2022
.50 Caliber Safety Release Testing	4	2022	3	2023
.50 Caliber Production Qualification Test (PQT)	4	2022	3	2023
.50 Caliber Limited User Evaluation (LUA)	2	2023	2	2023
.50 Caliber Milestone C (MS C)	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP4 / *One-Way Luminescence for Small Caliber Ammo*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EP4: *One-Way Luminescence for Small Caliber Ammo*	-	13.467	4.896	7.565	-	7.565	3.079	-	-	-	0.000	29.007
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) 2023 funding will support continuing Engineering and Manufacturing Development (EMD), performing Production Qualification Testing (PQT), conducting Live Fire Test and Evaluation (LFT&E), 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 2023 funding will also support EMD efforts, performing PQT, conducting LFT&E, and a Soldier Touch Point (STP) / User Evaluation for the 5.56mm variant.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: EMD 7.62mm ***Description:*** EMD efforts for the 7.62mm variant. ***FY 2023 Plans:*** Complete EMD efforts, perform PQT, conduct LFT&E, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for LRIP. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Congressional Mark in FY22. Planned EMD activities in FY 2023.	7.100	-	1.626
Title: EMD 5.56mm ***Description:*** EMD efforts for the 5.56mm variants. ***FY 2022 Plans:*** Continue EMD efforts, conduct a PDR, conduct PPQT, conduct a STP / User Evaluation, and perform activities to prepare for transition of manufacturing to the LCAAP in preparation for LRIP. ***FY 2023 Plans:***	6.217	4.602	5.939

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Continue EMD efforts, conduct PQT, conduct LFT&E, and conduct a STP / User Evaluation. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Planned EMD activities in FY 2023.			
Title: Prototype and Concept Evaluation for Other Small Caliber Ammunition ***Description:*** Supports concept development/evaluation of applying OWL tracer solutions to other small caliber ammunition; including .50 Caliber ammunition. ***FY 2022 Plans:*** Will continue to assess OWL technologies for potential to adapt the technology into other small caliber ammunition variants. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** No planned activities in FY 2023.	0.150	0.115	-
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) ***FY 2022 Plans:*** FY 2022 funding to be assessed per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.	-	0.179	-
Accomplishments/Planned Programs Subtotals	13.467	4.896	7.565

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP4 / *One-Way Luminescence for Small Caliber Ammo*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.179		-		-		-	0.000	0.179	-
		Subtotal	-	-		0.179		-		-		-	0.000	0.179	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Manager Maneuver Ammunition Systems (PM MAS)	Various	Picatinny Arsenal : New Jersey	0.015	0.002	Feb 2021	-		-		-		-	0.000	0.017	-
EMD Contractor # 1 (7.62mm)	Option/ CPFF	General Dynamics : St. Petersburg, FL	3.908	1.683	Jul 2021	-		-		-		-	0.000	5.591	-
EMD Contractor # 2 (7.62mm)	Option/ CPFF	Nammo Tally : Mesa, AZ	3.482	1.142	Nov 2020	-		-		-		-	0.000	4.624	-
OWL Prototype Development (7.62mm)	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	0.951	1.372	Nov 2020	-		-		-		-	Continuing	Continuing	Continuing
OWL Manufacturing Tooling Development (7.62mm)	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	1.244	-		-		-		-		-	Continuing	Continuing	Continuing
Lake City Army Ammunition Plant Tech Integration PH II (5.56mm)	Option/ FFP	OLIN Winchester Corporation : Independence, MO	-	-		1.000	Jan 2022	-		-		-	Continuing	Continuing	Continuing
OWL Manufacturing Tooling Development (5.56mm)	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, NJ	-	1.571	Nov 2020	0.250	Oct 2021	-		-		-	Continuing	Continuing	Continuing
EMD PH I Contract (5.56mm)	Option/ CPFF	OLIN Winchester Corporation : Independence, MO	-	3.000	Mar 2021	2.000	Oct 2021	2.800	Oct 2022	-		2.800	Continuing	Continuing	Continuing
		Subtotal	9.600	8.770		3.250		2.800		-		2.800	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP4 / *One-Way Luminescence for Small Caliber Ammo*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DEVCOM-AC Engineering Support 7.62mm	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	2.384	2.450	Nov 2020	-		0.500	Oct 2022	-		0.500	Continuing	Continuing	Continuing
DEVCOM-AC Engineering Support 5.56mm	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	1.546	Nov 2020	0.721	Oct 2021	1.886	Oct 2022	-		1.886	Continuing	Continuing	Continuing
OWL Solutions/Evaluation	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	0.095	-		0.115	Oct 2021	-		-		-	Continuing	Continuing	Continuing
		Subtotal	2.479	3.996		0.836		2.386		-		2.386	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
U.S. Army Aberdeen Test Center (ATC) 7.62mm	MIPR	Aberdeen Proving Ground : Maryland	0.485	0.322	May 2021	-		-		-		-	Continuing	Continuing	Continuing
Independent Testing (7.62mm)	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, MO	0.085	-		-		-		-		-	0.000	0.085	-
Soldier Touch Point 2 (7.62mm)	MIPR	US Army Maneuver Battle Labs : Fort Benning, GA	0.180	-		-		-		-		-	0.000	0.180	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP4 / *One-Way Luminescence for Small Caliber Ammo*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radar Testing (7.62mm)	MIPR	US Army Research Lab : Aberdeen, MD	1.103	-		-		-		-		-	Continuing	Continuing	Continuing
Production Qualification Testing (PQT) 7.62mm	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		-		0.826	Aug 2022	-		0.826	0.000	0.826	-
Live Fire Test and Evaluation (LFT&E) 7.62mm	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		-		0.300	Aug 2022	-		0.300	0.000	0.300	-
Soft Hard Target Testing 5.56mm	MIPR	Development Command Army Research Lab (ARL) : Aberdeen, MD	-	0.225	Apr 2021	-		-		-		-	0.000	0.225	-
Safety Release Testing (5.56mm)	MIPR	Aberdeen Test Center : Aberdeen, MD	-	0.079	Jul 2021	-		-		-		-	0.000	0.079	-
Radar Testing (5.56mm)	MIPR	US Army Research Lab : Aberdeen, MD	-	0.075	Feb 2022	0.100	Nov 2021	-		-		-	Continuing	Continuing	Continuing
Pre-Production Qualification Testing (PPQT) 5.56mm	MIPR	Aberdeen Test Center : Aberdeen, MD	-	-		0.300	May 2022	-		-		-	Continuing	Continuing	Continuing
Independent Testing (5.56mm)	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, MO	-	-		0.031	May 2022	-		-		-	Continuing	Continuing	Continuing
Soldier Touch Point 1 (5.56mm)	MIPR	US Army Maneuver Battle Labs : Fort Benning, GA	-	-		0.200	Feb 2022	-		-		-	Continuing	Continuing	Continuing
Soldier Touch Point 2 (5.56mm)	MIPR	US Army Maneuver Battle Labs : Fort Benning, GA	-	-		-		0.150	Dec 2022	-		0.150	0.000	0.150	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP4 / *One-Way Luminescence for Small Caliber Ammo*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Production Qualification Testing (PQT) 5.56mm	TBD	Aberdeen Test Center : Aberdeen, MD	-	-		-		0.778	Apr 2023	-		0.778	0.000	0.778	-
Live Fire Test and Evaluation (LFT&E) 5.56mm	TBD	US Army Research Lab : Aberdeen, MD	-	-		-		0.300	Jul 2023	-		0.300	0.000	0.300	-
Verification Testing 5.56mm	MIPR	Night Vision Labs : Fort Belvoir, VA	-	-		-		0.025	Nov 2022	-		0.025	0.000	0.025	-
		Subtotal	1.853	0.701		0.631		2.379		-		2.379	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.932	13.467		4.896		7.565		-		7.565	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

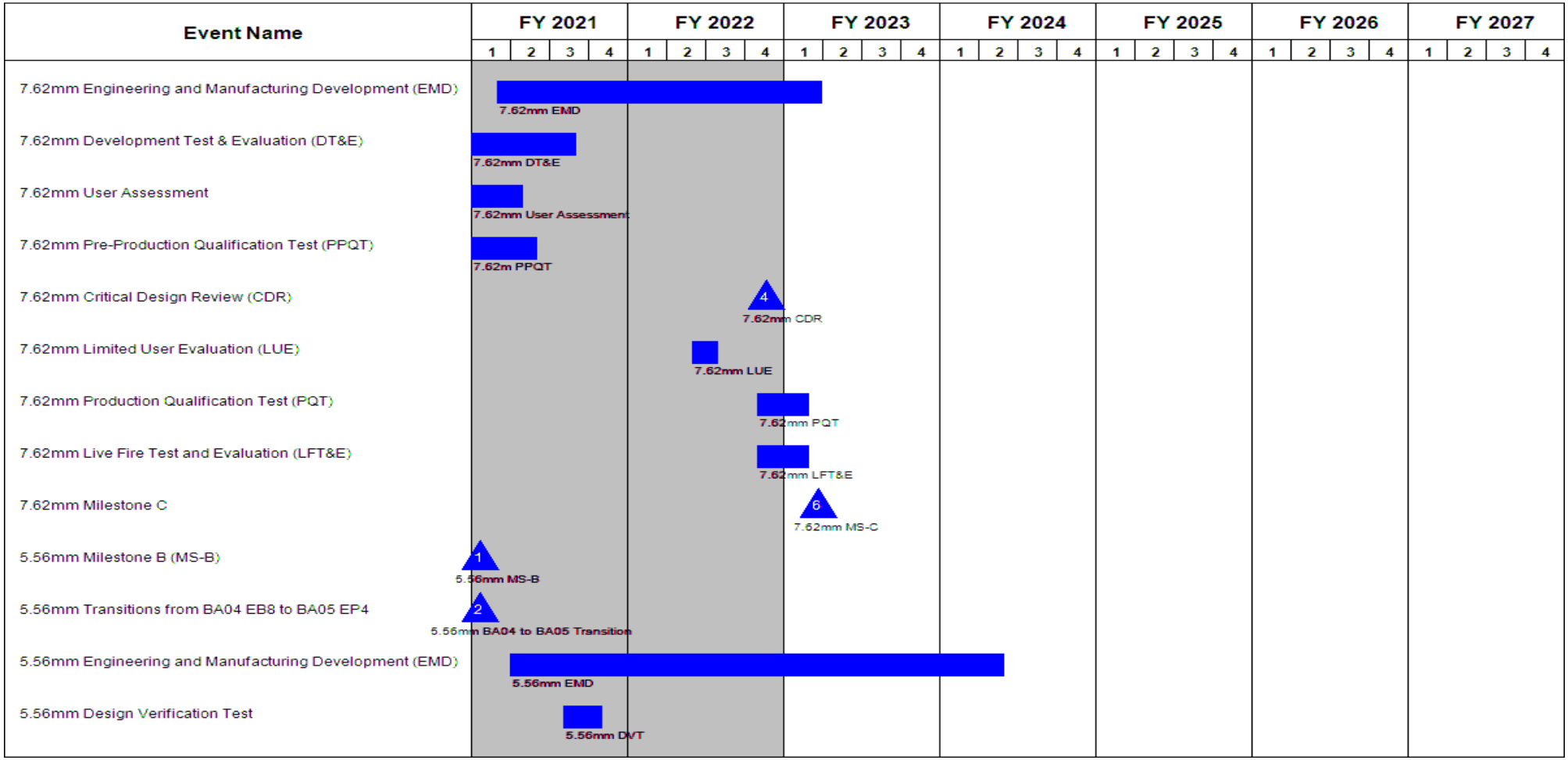


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

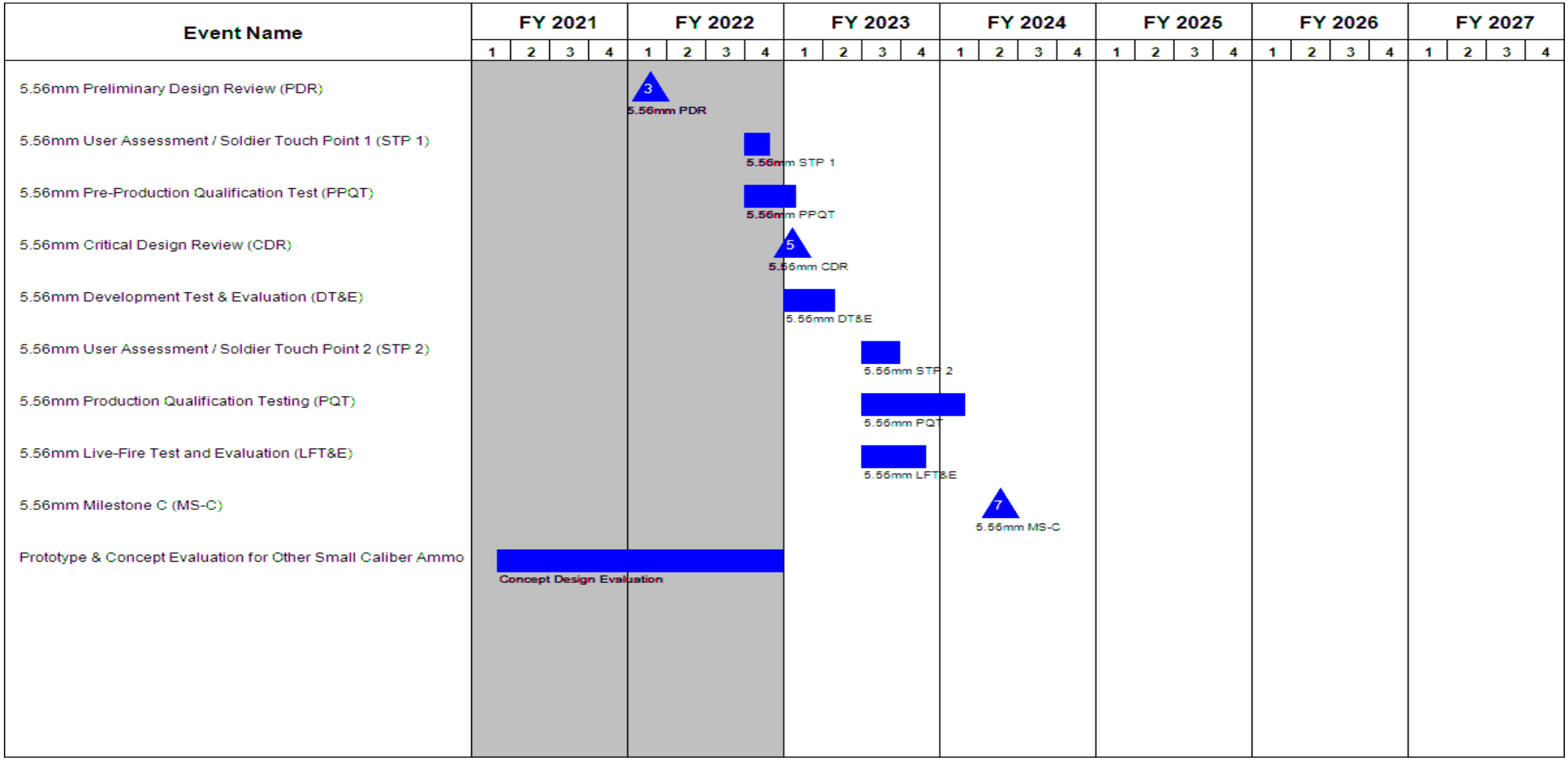


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

Schedule Details

	Start		End	
Events	**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	1	2023
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)	4	2022	4	2022
7.62mm Limited User Evaluation (LUE)	2	2022	3	2022
7.62mm Production Qualification Test (PQT)	4	2022	1	2023
7.62mm Live Fire Test and Evaluation (LFT&E)	4	2022	1	2023
7.62mm Milestone C	1	2023	1	2023
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

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP4 / *One-Way Luminescence for Small Caliber Ammo*

	Start		End	
Events	**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)	4	2022	4	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)	3	2023	1	2024
5.56mm Live-Fire Test and Evaluation (LFT&E)	3	2023	4	2023
5.56mm Milestone C (MS-C)	2	2024	2	2024
Prototype & Concept Evaluation for Other Small Caliber Ammo	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP7 / *Aviation Airborne Expendable Countermeasures*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EP7: *Aviation Airborne Expendable Countermeasures*	-	4.313	7.526	6.363	-	6.363	-	-	-	-	0.000	18.202
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 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 2023 will support environmental testing, developmental testing, operational testing and flight testing to support XM215 Milestone C as well as operational test and evaluation for the XM20 design.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Improvements to Countermeasure Flares	4.313	7.251	6.363
Description: 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.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP7 / *Aviation Airborne Expendable Countermeasures*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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. ***FY 2023 Plans:*** FY 2023 funding will support XM215 environmental testing, developmental testing, operational testing and flight testing in addition to XM20 Operational testing. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding were slightly reduced due to a slight decrease in required countermeasure flight testing.			
Title: FY 2022 SBIR/STTR Transfer ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.275	-
Accomplishments/Planned Programs Subtotals	4.313	7.526	6.363

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• EB9: *Aviation Airborne Expendable Countermeasures*	4.332	5.529	0.000	-	0.000	-	-	-	-	0.000	9.861
• E49101: *Flare, Aircraft Countermeasure, RF (Passive)*	-	-	1.036	-	1.036	-	-	-	-	0.000	1.036

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 transitioned both designs to industry via Other Transaction Authority (OTA) contract mechanism in FY 2021. Industry prototypes will undergo Developmental and Operational Testing and final XM20 and XM215 and configurations to support Milestone C in FY 2022 and FY 2023 respectively.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP7 / *Aviation Airborne Expendable Countermeasures*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY 2022 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.275		-		-		-	0.000	0.275	-
		Subtotal	-	-		0.275		-		-		-	0.000	0.275	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM215 Development Government	MIPR	CCDC Armaments Center : Picatinny Arsenal, NJ	1.426	0.480	Mar 2021	0.658	Mar 2022	-		-		-	0.000	2.564	-
XM215 Development Contractor 1	C/CPFF	Kilgore : Toone, TN	-	1.378	May 2021	1.396	Apr 2022	1.413	Oct 2022	-		1.413	0.000	4.187	-
		Subtotal	1.426	1.858		2.054		1.413		-		1.413	0.000	6.751	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM215 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	1.280	1.478	Jan 2021	1.643	Mar 2022	1.394	Oct 2022	-		1.394	0.000	5.795	-
XM20 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		0.913	Apr 2022	0.803	Oct 2022	-		0.803	0.000	1.716	-
XM215 Prototyping Support	MIPR	Naval Surface Warfare Center : Crane, IN	0.500	-		-		-		-		-	0.000	0.500	-
		Subtotal	1.780	1.478		2.556		2.197		-		2.197	0.000	8.011	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EP7 / *Aviation Airborne Expendable Countermeasures*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM215 Flight Testing	MIPR	Various : Various	-	-		1.201	Mar 2022	1.080	Apr 2023	-		1.080	0.000	2.281	-
XM215 Modeling and Simulation	MIPR	Naval Air Warfare : China Lake, CA	0.350	0.181	Mar 2021	0.350	Mar 2022	0.350	Jan 2023	-		0.350	0.000	1.231	-
XM20 Operational Flight Testing	MIPR	Various : Various	-	-		1.090	Sep 2022	1.323	Nov 2022	-		1.323	0.000	2.413	-
XM215 Seeker Bowl Flight Testing	MIPR	Various : Various	1.161	0.796	Jan 2021	-		-		-		-	0.000	1.957	-
		Subtotal	1.511	0.977		2.641		2.753		-		2.753	0.000	7.882	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.717	4.313		7.526		6.363		-		6.363	0.000	22.919	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP7 / *Aviation Airborne Expendable Countermeasures*

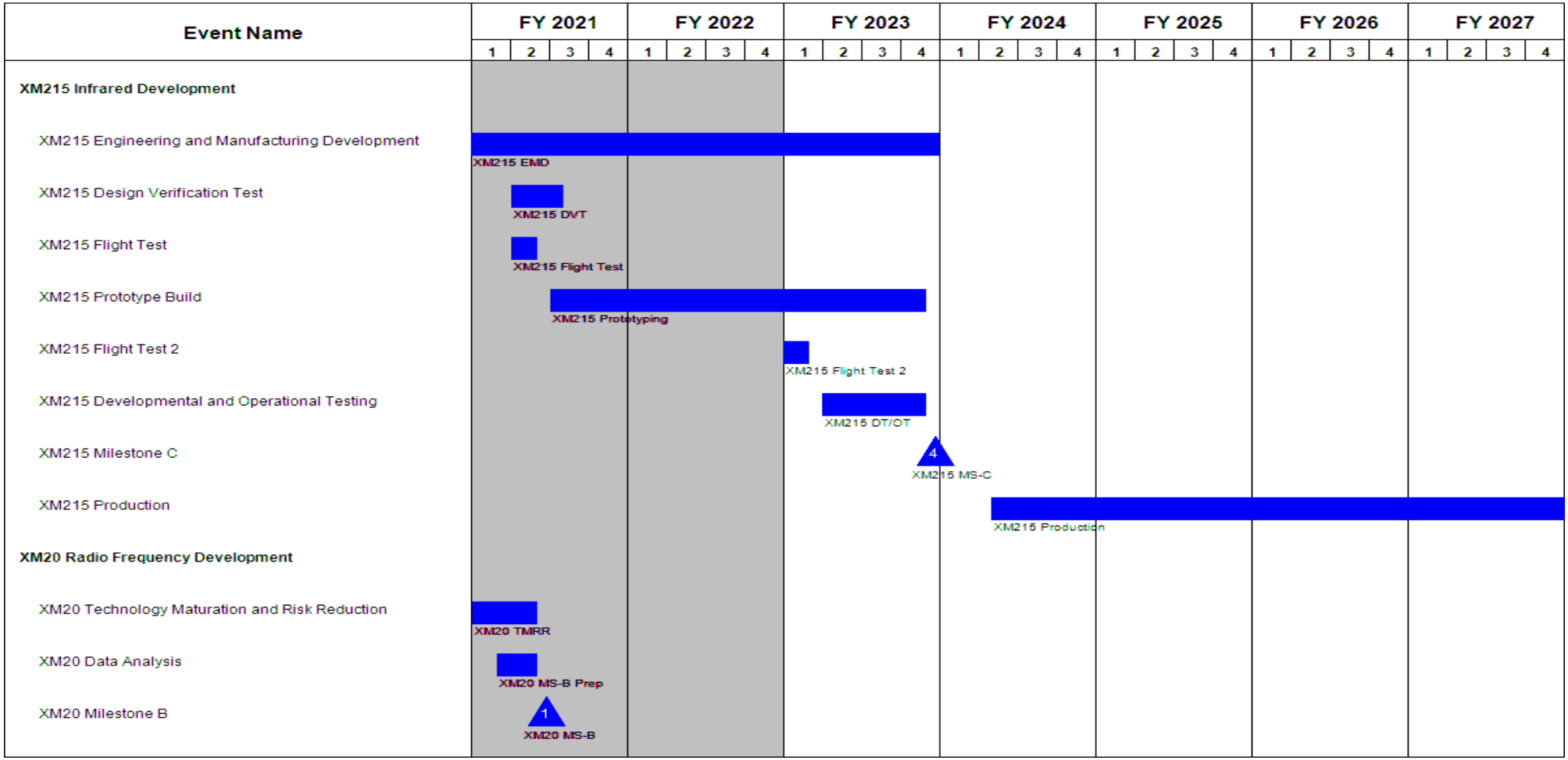
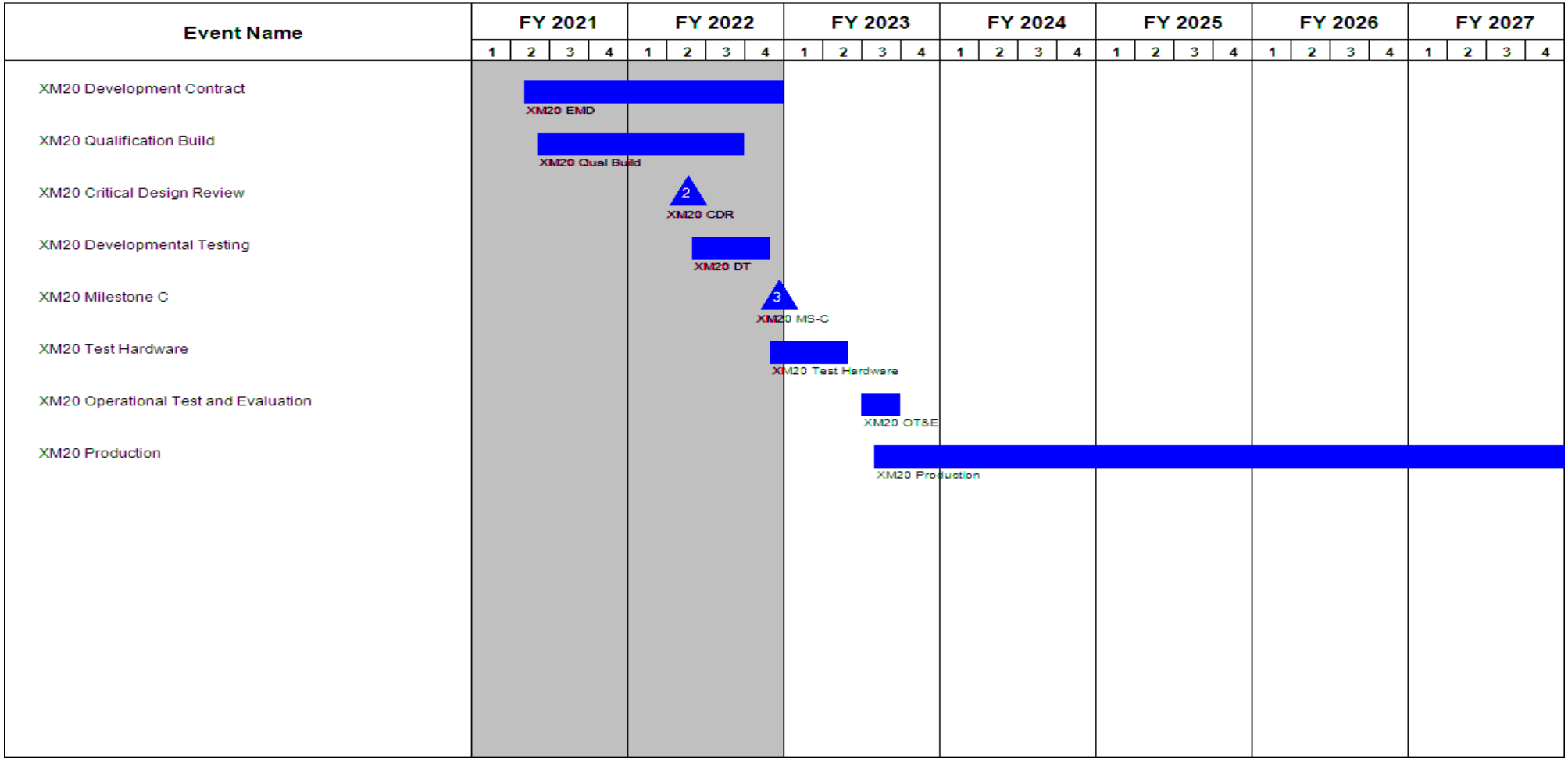


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP7 / *Aviation Airborne Expendable Countermeasures*



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.

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP7 / *Aviation Airborne Expendable Countermeasures*

Schedule Details

	Start		End	
Events	**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	2023
XM215 Design Verification Test	2	2021	3	2021
XM215 Flight Test	2	2021	2	2021
XM215 Prototype Build	3	2021	4	2023
XM215 Flight Test 2	1	2023	1	2023
XM215 Developmental and Operational Testing	2	2023	4	2023
XM215 Milestone C	4	2023	4	2023
XM215 Production	2	2024	2	2029
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

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EP7 / *Aviation Airborne Expendable Countermeasures*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM20 Data Analysis	1	2021	2	2021
XM20 Milestone B	2	2021	2	2021
XM20 Development Contract	2	2021	4	2022
XM20 Qualification Build	2	2021	3	2022
XM20 Critical Design Review	2	2022	2	2022
XM20 Developmental Testing	2	2022	4	2022
XM20 Milestone C	4	2022	4	2022
XM20 Test Hardware	4	2022	2	2023
XM20 Operational Test and Evaluation	3	2023	3	2023
XM20 Production	3	2023	4	2028

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.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU4 / *40mm HV Improved High Explosive Dual Purpose*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EU4: *40mm HV Improved High Explosive Dual Purpose*	-	9.357	2.111	2.073	-	2.073	-	-	-	-	0.000	13.541
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

40 millimeter (mm) High Velocity (HV) High Explosive Dual Purpose - Air burst (HEDP-AB) is a new capability identified as a Warfighter counter-defilade requirement 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. XM1176 HEDP-AB cartridges are manufactured by de-fuzing legacy M430A1 cartridges and installing a new airburst capable fuze onto the M430A1 warhead. FY 2023 funding supports the Live Fire Testing & Evaluation (LFT&E) that is required due to the program being on Director, Operational Test & Evaluation (DOT&E) Oversight.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Engineering and Manufacturing Development (EMD)	9.357	2.034	2.073
Description: Award EMD contracts to support Design Engineering Testing (DET) and Developmental Test & Evaluation (DT&E) of the 40mm dual purpose airburst capability.			
FY 2022 Plans: 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.			
FY 2023 Plans: FY 2023 funding supports the Live Fire Testing & Evaluation (LFT&E) that is required due to the program being on DOT&E Oversight.			
FY 2022 to FY 2023 Increase/Decrease Statement: Slight increase due to economic assumptions			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	-	0.077	-
FY 2022 Plans: FY 2022 funding to be assessed per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A).			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU4 / *40mm HV Improved High Explosive Dual Purpose*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.			
Accomplishments/Planned Programs Subtotals	9.357	2.111	2.073

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E70505: *CTG, 40MM, HV HEDP-AB, XM1176*	-	13.844	15.853	-	15.853	-	2.972	3.228	3.228	0.000	39.125

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 air burst 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 option will be awarded for Low Rate Initial Production (LRIP) followed by two options.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU4 / *40mm HV Improved High Explosive Dual Purpose*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	various : various	-	-		0.077	Mar 2022	-		-		-	0.000	0.077	-
		Subtotal	-	-		0.077		-		-		-	0.000	0.077	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Manager Maneuver Ammunition Systems (PM MAS)	MIPR	Picatinny Arsenal : NJ	0.542	-		-		0.500	Nov 2022	-		0.500	0.000	1.042	-
Engineering and Manufacturing Development (EMD)	C/CPFF	Rheinmatell, Day & Zimmermann Munitions : Rosslyn, Va.	9.830	5.735	Dec 2020	-		-		-		-	0.000	15.565	-
		Subtotal	10.372	5.735		-		0.500		-		0.500	0.000	16.607	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DEVCOM-AC Engineering Support	MIPR	Development Command - Armaments Center (DEVCOM-AC) : Picatinny Arsenal, NJ	5.390	2.024	Oct 2020	1.784	Oct 2021	1.000	Nov 2022	-		1.000	0.000	10.198	-
		Subtotal	5.390	2.024		1.784		1.000		-		1.000	0.000	10.198	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU4 / *40mm HV Improved High Explosive Dual Purpose*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test and Evaluation (DT&E)	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	1.200	Oct 2021	-		-		-		-	0.000	1.200	-
Limited User Evaluation (LUE)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	0.050	0.398	Aug 2021	0.250	Aug 2022	-		-		-	0.000	0.698	-
Live Fire Test & Evaluation	MIPR	Aberdeen Test Center (TAC) : Aberdeen Proving Ground, Md	-	-		-		0.573	Jul 2023	-		0.573	0.000	0.573	-
		Subtotal	0.050	1.598		0.250		0.573		-		0.573	0.000	2.471	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.812	9.357		2.111		2.073		-		2.073	0.000	29.353	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU4 / *40mm HV Improved High Explosive Dual Purpose*

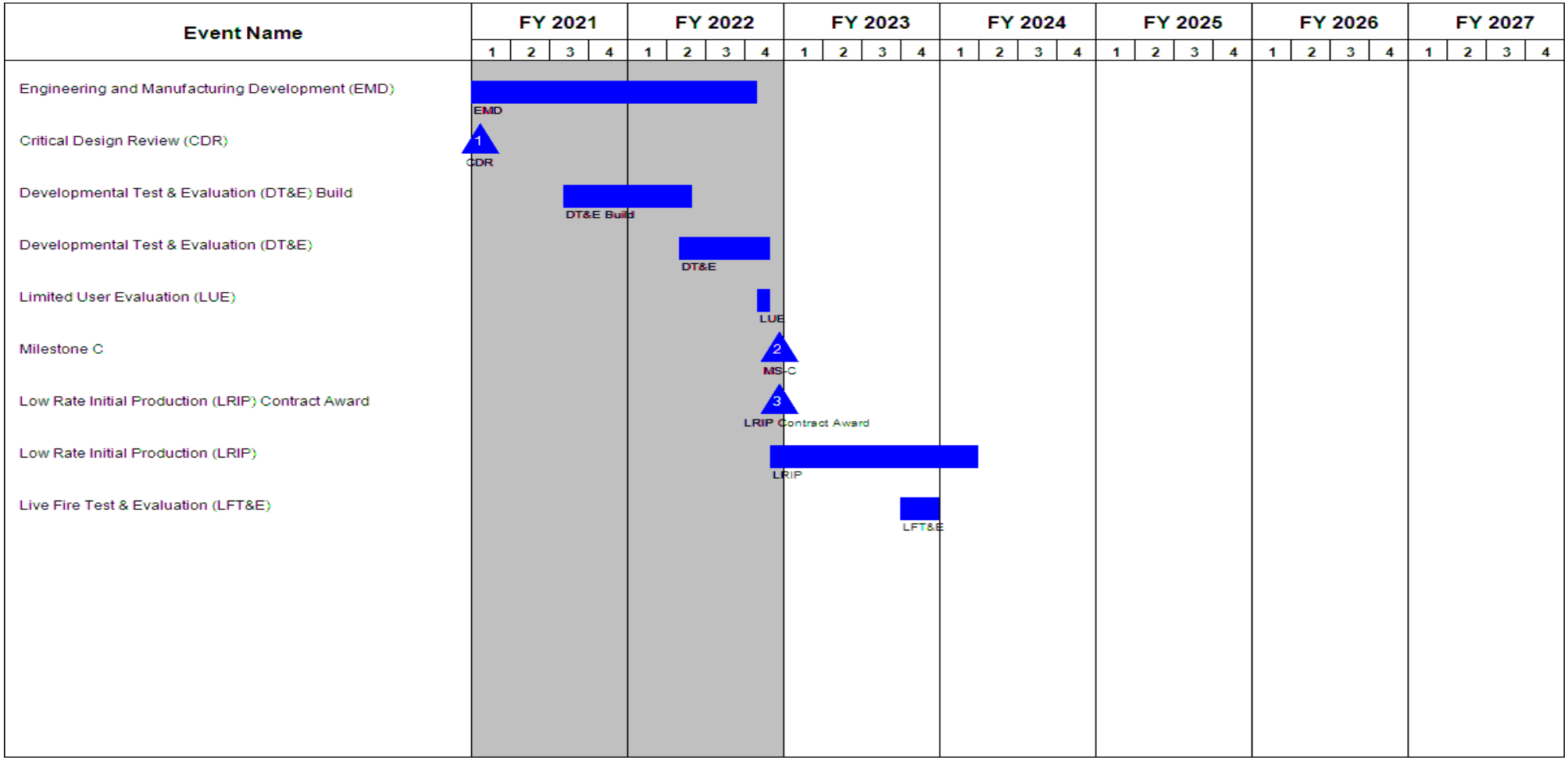


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU4 / *40mm HV Improved High Explosive Dual Purpose*

Schedule Details

	Start		End	
Events	**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	3	2021	2	2022
Developmental Test & Evaluation (DT&E)	2	2022	4	2022
Limited User Evaluation (LUE)	4	2022	4	2022
Milestone C	4	2022	4	2022
Low Rate Initial Production (LRIP) Contract Award	4	2022	4	2022
Low Rate Initial Production (LRIP)	4	2022	1	2024
Live Fire Test & Evaluation (LFT&E)	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EU5: *.50 Caliber All-Purpose Tactical cartridge (APTC)*	-	3.931	-	-	-	-	-	-	-	-	0.000	3.931
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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) 2023 request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: .50 Cal All-Purpose Tactical Cartridge EMD	3.931	-	-
Description: Engineering and Manufacturing Development (EMD) Activities for the development of the .50 Caliber All-Purpose Tactical Cartridge APTC.			
Accomplishments/Planned Programs Subtotals	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).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-
		Subtotal	-	1.700		-		-		-		-	0.000	1.700	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DEVCOM-AC Engineering Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	0.741	May 2021	-		-		-		-	0.000	0.741	-
ARL Engineering Support	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	0.640	May 2021	-		-		-		-	0.000	0.640	-
		Subtotal	-	1.381		-		-		-		-	0.000	1.381	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	0.350	May 2021	-		-		-		-	0.000	0.350	-
		Subtotal	-	0.850		-		-		-		-	0.000	0.850	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.931		-		-		-		-	0.000	3.931	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*

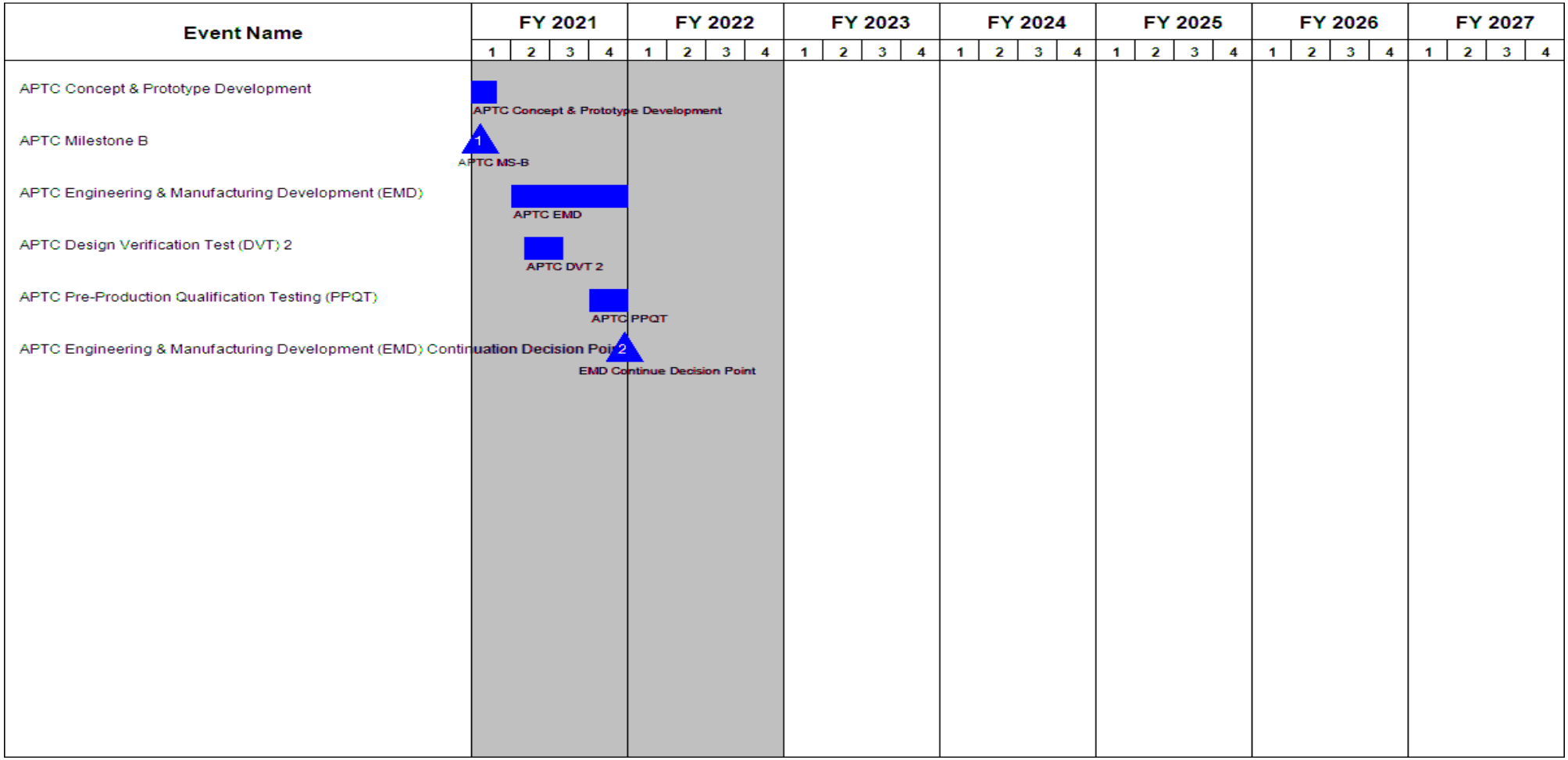


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU5 / *.50 Caliber All-Purpose Tactical cartridge (APTC)*

Schedule Details

	Start		End	
Events	**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)

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU6 / *155mm HE Rocket Assist Project Extended Range*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EU6: *155mm HE Rocket Assist Project Extended Range*	-	51.956	27.655	14.382	-	14.382	29.380	15.911	2.701	-	0.000	141.985
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

XM1113 Extended Range (XM1113ER) nomenclature has been changed to XM1210.

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 XM1210 (formerly known as XM1113ER) 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) 2023 funding will support the completion of XM1113 qualification activities, engineering efforts to evaluate test data to ensure that the projectile is safe, suitable and operationally effective as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and Full Materiel Release (FMR). FY 2023 funding will also support XM1210 qualification and firing tables testing required for Safety Release for First Unit Issued (FUI) to support the ERCA Operational Assessment, Urgent Materiel Release (UMR) qualification activities and the initiation of FMR development activities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: 155mm High Explosive Rocket Assisted Projectile (RAP) Extended Range	30.956	26.646	14.382
Description: The XM1113 will replace the obsolete M549A1 in 39 caliber weapon systems and increase range from 30km to 40km. The XM1210, previously known as XM1113 Extended Range (XM1113ER), will be optimized for 58 caliber guns and allow commanders to provide accurate cannon artillery fires at ranges of 70km and greater with ERCA.			
FY 2022 Plans: FY 2022 funding supports 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 XM1210 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.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 funding will support the completion of XM1113 qualification activities, engineering efforts to evaluate test data to ensure that the projectile is safe, suitable and operationally effective as well as the gathering of all statutory and regulatory requirements in support of a Milestone C and Full Materiel Release (FMR). FY 2023 funding will also support XM1210 qualification and firing tables testing required for Safety Release for First Unit Issued (FUI) to support the ERCA Operational Assessment, Urgent Materiel Release (UMR) qualification activities and the initiation of FMR development activities. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in funding in FY 2023 due to the reduction in contract costs associated with the XM1113 hardware required to support qualification and Full Materiel Release (FMR) and Milestone C activities, as well as reduction in development costs and hardware required to support XM1210 as FY 2023 focuses primarily on qualification testing for XM1210.			
Title: FY 2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	1.009	-
Accomplishments/Planned Programs Subtotals	30.956	27.655	14.382

	FY 2021	FY 2022
Congressional Add: Precision Guidance Aft ***FY 2021 Accomplishments:*** FY 2021 Congressional Add supported the completion of Precision Guidance Aft development and test efforts to include fuze survivability when fired out of the ERCA weapon system. Knowledge points achieved are being utilized to support long range precision fuze development efforts executed on Program Element 0604802A, Project S36, Precision Guidance Kit, and provide a risk mitigation alternative to support the ERCA System of Systems Operational Assessment.	21.000	-
Congressional Adds Subtotals	21.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E66501: *PROJ, 155mm ARTY HE RAP, XM1113*	26.972	52.098	53.588	-	53.588	45.410	46.303	56.495	56.495	0.000	337.361
• E27121: *PROJ, 155MM ARTY HE RAP, M1210*	-	-	17.489	-	17.489	3.007	18.686	22.764	32.671	0.000	94.617

Remarks

Procurement of Ammunition, Army (PAA) budget line items, Standard Study Numbers E66501 and E27121, have been established to resource the procurement of XM1113 and XM1210 quantities.

D. Acquisition Strategy

The 155mm HE Rocket Assisted Projectile, Extended Range Project is utilizing a competitively awarded 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 competitively awarded DOTC OTA initiative with GD-OTS is being utilized for XM1210 development and qualification activities required to achieve ranges of 70km and greater with ERCA. The Project will complete XM1210 qualification efforts in support of Safety Release for First Unit Issued (FUI) for the ERCA Operational Assessment and Urgent Materiel Release (UMR). A competitive DOTC OTA contract will be utilized to support Engineering Manufacturing and Development (EMD) of the XM1210 Full Materiel Release (FMR) variant. XM1113 will transition to Federal Acquisition Regulation (FAR) based production contracts in support of UMR, Low Rate Initial Production (LRIP) and Full Rate Production (FRP). XM1210 will transition to a FAR based production contract in support of UMR deliveries.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU6 / *155mm HE Rocket Assist Project Extended Range*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	1.573	0.047	Jul 2021	0.100	Oct 2021	0.100	Oct 2022	-		0.100	0.000	1.820	-
FY 2022 SBIR/STTR Transfer	TBD	Various : Various	-	-		1.009		-		-		-	0.000	1.009	-
		Subtotal	1.573	0.047		1.109		0.100		-		0.100	0.000	2.829	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DOTC - XM1113 and XM1210 Engineering and Manufacturing Development (EMD)	MIPR	DoD Ordnance Technology Consortium Other Transaction Agreement (DOTC OTA) : Various	45.749	27.933	Nov 2020	19.078	Nov 2021	6.929	Nov 2022	-		6.929	0.000	99.689	-
Cornerstone - Precision Guidance Aft Development - Congressional Add	MIPR	Cornerstone OTA : Northrup Grumman Defense Systems	7.436	16.825	Jun 2021	-		-		-		-	0.000	24.261	-
		Subtotal	53.185	44.758		19.078		6.929		-		6.929	0.000	123.950	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center	5.744	2.781	Mar 2021	2.818	Nov 2021	2.253	Nov 2022	-		2.253	0.000	13.596	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU6 / *155mm HE Rocket Assist Project Extended Range*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(DEVCOM AC) : Picatinny Arsenal, NJ													
Fire Control Software Integration	MIPR	U.S. Army Communications-Electronics Command (CECOM) : Aberdeen, MD	0.200	-		-		-		-		-	0.000	0.200	-
		Subtotal	5.944	2.781		2.818		2.253		-		2.253	0.000	13.796	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	2.665	4.175	Jan 2021	4.650	Mar 2022	5.100	Jan 2023	-		5.100	0.000	16.590	-
Arena Testing	MIPR	Army Test and Evaluation Command (ATEC) Aberdeen Proving Ground (APG) : Aberdeen, MD	1.308	-		-		-		-		-	0.000	1.308	-
Material Testing	MIPR	National Technical Systems (NTS) : Camden, AR	0.206	-		-		-		-		-	0.000	0.206	-
Material Testing	MIPR	Naval Air Warfare Center (NAWC) : China Lake, CA	0.130	-		-		-		-		-	0.000	0.130	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU6 / *155mm HE Rocket Assist Project Extended Range*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Material and Setback Testing	MIPR	Naval Surface Warfare Center (NSWC) : Indian Head, MD	0.139	0.195	Mar 2021	-		-		-		-	0.000	0.334	-
		Subtotal	5.048	4.370		4.650		5.100		-		5.100	0.000	19.168	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	65.750	51.956		27.655		14.382		-		14.382	0.000	159.743	N/A

Remarks

XM1113 Extended Range (XM1113ER) nomenclature changed to XM1210.

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

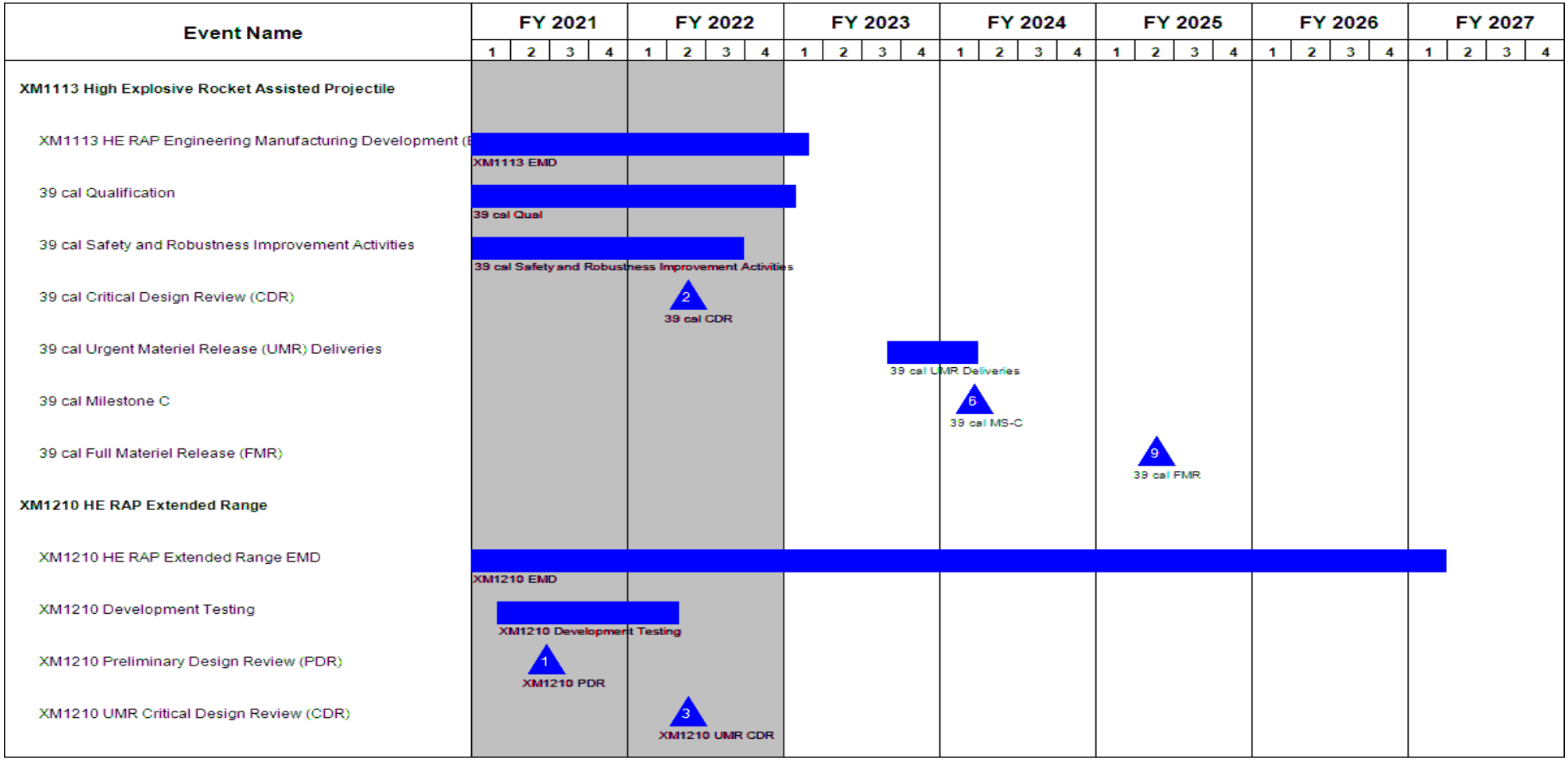


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

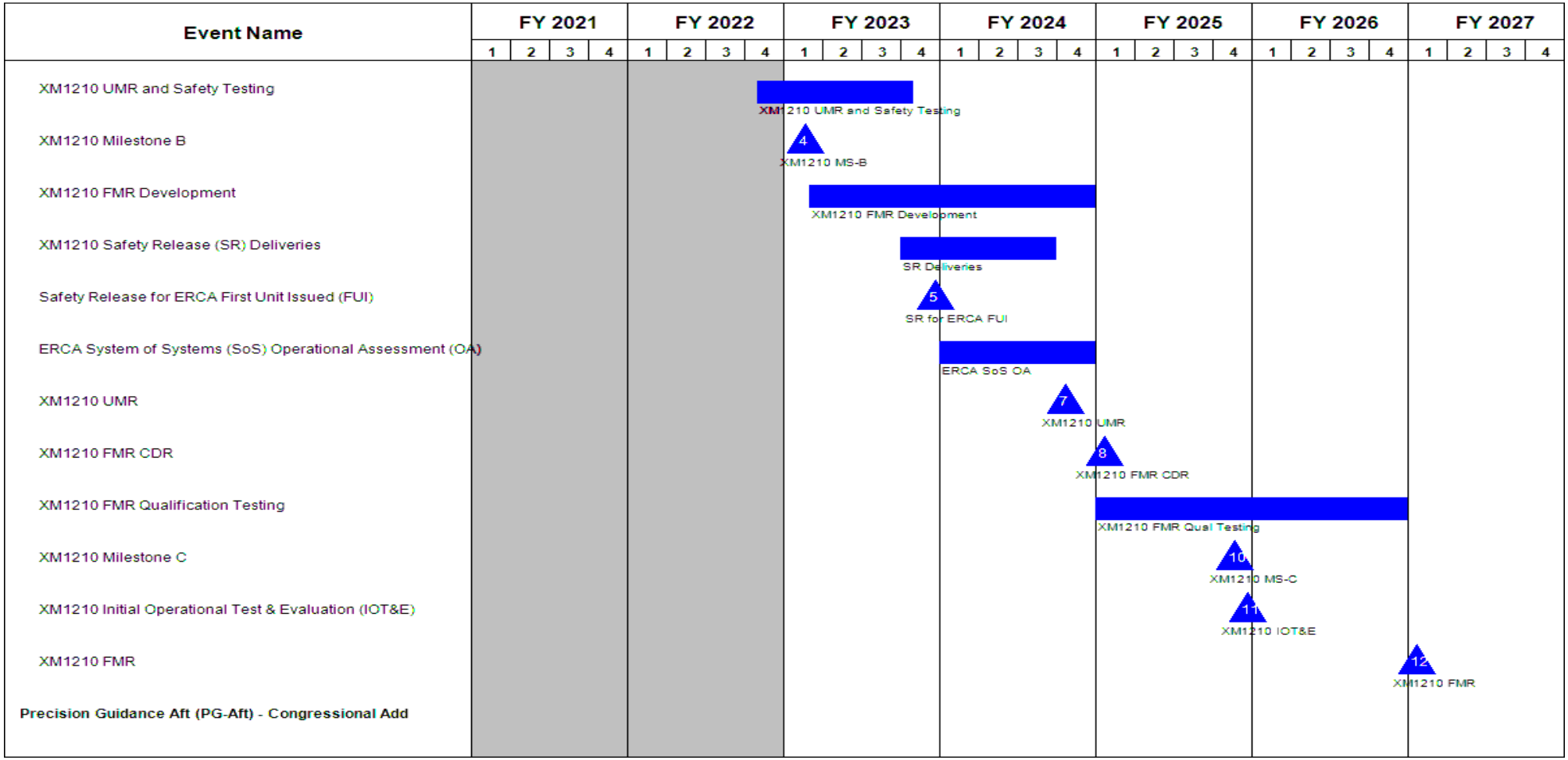
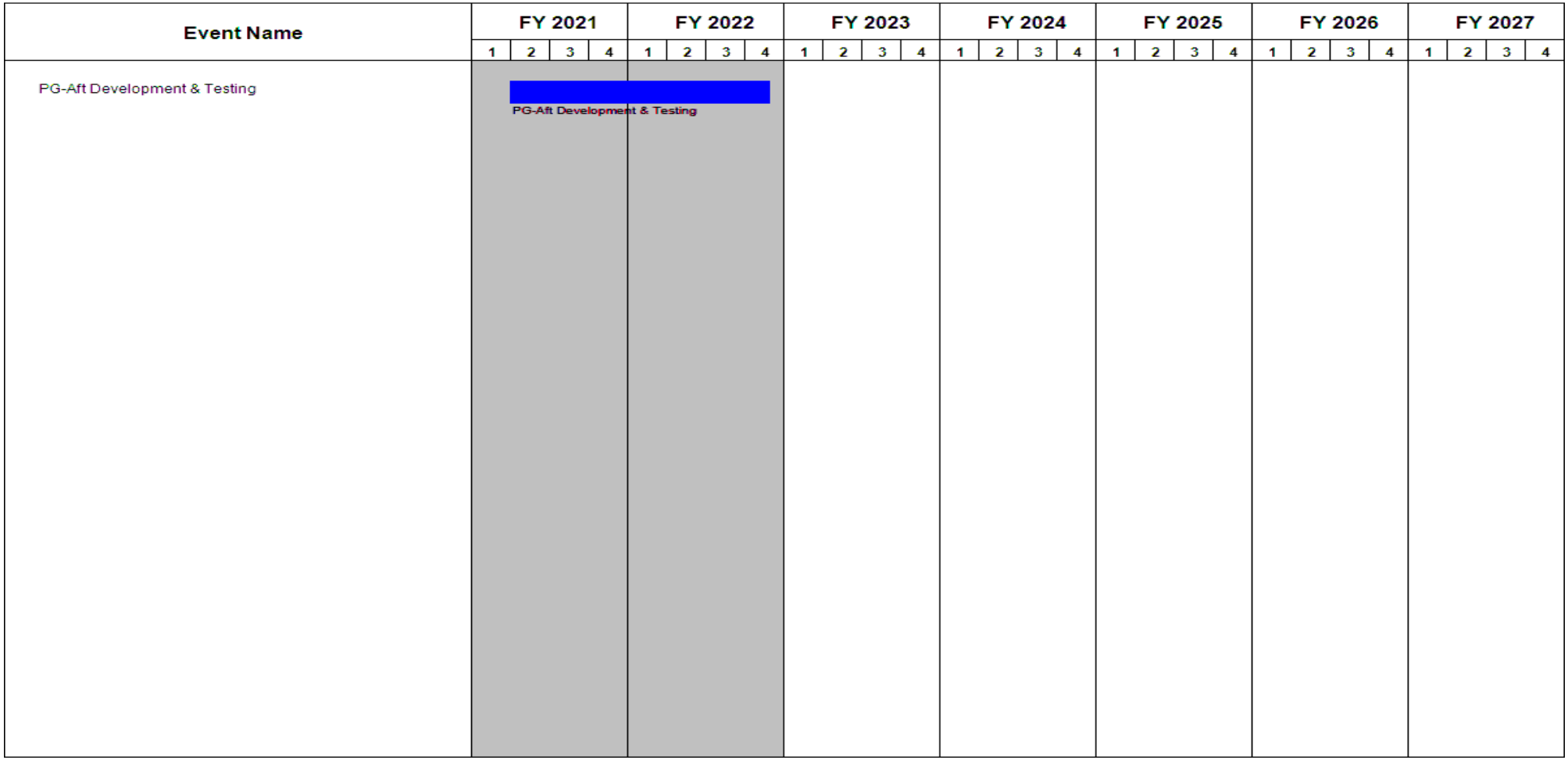


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*



Note

XM1113 will achieve lethality against targets at 40km range. XM1210 (formerly XM1113ER) will achieve 70+km out of ERCA.

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

FY 2021 Congressional Add supported the completion of Precision Guidance Aft development and test efforts to include fuze survivability when fired out of the ERCA weapon system. Knowledge points achieved are being utilized to support long range precision fuze development efforts executed on Program Element 0604802A, Project S36, Precision Guidance Kit, and provide a risk mitigation alternative to support the ERCA System of Systems Operational Assessment.

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM1113 High Explosive Rocket Assisted Projectile	1	2019	4	2023
XM1113 HE RAP Engineering Manufacturing Development (EMD)	4	2019	1	2023
39 cal Qualification	4	2019	1	2023
39 cal Safety and Robustness Improvement Activities	1	2021	3	2022
39 cal Critical Design Review (CDR)	2	2022	2	2022
39 cal Urgent Materiel Release (UMR) Deliveries	3	2023	1	2024
39 cal Milestone C	1	2024	1	2024
39 cal Full Materiel Release (FMR)	2	2025	2	2025
XM1210 HE RAP Extended Range	3	2021	4	2023
XM1210 HE RAP Extended Range EMD	2	2020	1	2027
XM1210 Development Testing	1	2021	2	2022
XM1210 Preliminary Design Review (PDR)	2	2021	2	2021
XM1210 UMR Critical Design Review (CDR)	2	2022	2	2022
XM1210 UMR and Safety Testing	4	2022	4	2023
XM1210 Milestone B	1	2023	1	2023
XM1210 FMR Development	1	2023	4	2024
XM1210 Safety Release (SR) Deliveries	4	2023	3	2024
Safety Release for ERCA First Unit Issued (FUI)	4	2023	4	2023
ERCA System of Systems (SoS) Operational Assessment (OA)	1	2024	4	2024
XM1210 UMR	4	2024	4	2024
XM1210 FMR CDR	1	2025	1	2025
XM1210 FMR Qualification Testing	1	2025	4	2026

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU6 / *155mm HE Rocket Assist Project Extended Range*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM1210 Milestone C	4	2025	4	2025
XM1210 Initial Operational Test & Evaluation (IOT&E)	4	2025	4	2025
XM1210 FMR	1	2027	1	2027
Precision Guidance Aft (PG-Aft) - Congressional Add	1	2020	1	2022
PG-Aft Development & Testing	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU7 / *Enhanced Lethality Cannon Munitions*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EU7: *Enhanced Lethality Cannon Munitions*	-	15.000	-	-	-	-	-	-	-	-	0.000	15.000
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 FY 2023, this Project does not have a Research Development Technology & Evaluation (RDT&E) request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
Congressional Add: 155mm XM1128 High Explosive Projectile	15.000	-
FY 2021 Accomplishments: FY 2021 Congressional Add funding is supporting the completion of XM1128 Engineering Manufacturing and Development activities and Extended Range Cannon Artillery (ERCA) weapon system and propulsion compatibility activities.		
Congressional Adds Subtotals	15.000	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E67802: *PROJ, 155mm ARTY HE-BB, XM1128*	-	16.961	28.825	-	28.825	65.512	68.139	83.457	83.457	0.000	346.351

Remarks

In FY 2022, 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.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU7 / *Enhanced Lethality Cannon Munitions*

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.) 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU7 / *Enhanced Lethality Cannon Munitions*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enhanced Lethality Cannon Munitons (ELCM) Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.636	-		-		-		-		-	0.000	0.636	-
		Subtotal	0.636	-		-		-		-		-	0.000	0.636	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1128 Qualification Test (PQT) Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	16.313	3.250	Oct 2021	-		-		-		-	0.140	19.703	-
XM1128 Qualification Test (PQT) Hardware	Reqn	Cornerstone Other Transaction Agreement (OTA) : Various	3.076	4.573	Nov 2021	-		-		-		-	0.000	7.649	-
XM1113 Prototype Hardware	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	4.494	-		-		-		-		-	0.000	4.494	-
		Subtotal	23.883	7.823		-		-		-		-	0.140	31.846	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1128 Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center	10.238	3.546	Sep 2021	-		-		-		-	1.377	15.161	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU7 / *Enhanced Lethality Cannon Munitions*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(CCDC AC) : Picatinny Arsenal, NJ													
XM1128 Firing Table Software Updates	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	2.123	0.821	Sep 2021	-		-		-		-	0.000	2.944	-
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	-
		Subtotal	13.717	4.367		-		-		-		-	1.377	19.461	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1128 Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	4.589	2.810	Jan 2022	-		-		-		-	0.000	7.399	-
XM1128 Testing	MIPR	Naval Surface Warfare Center	1.575	-		-		-		-		-	0.000	1.575	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU7 / *Enhanced Lethality Cannon Munitions*	

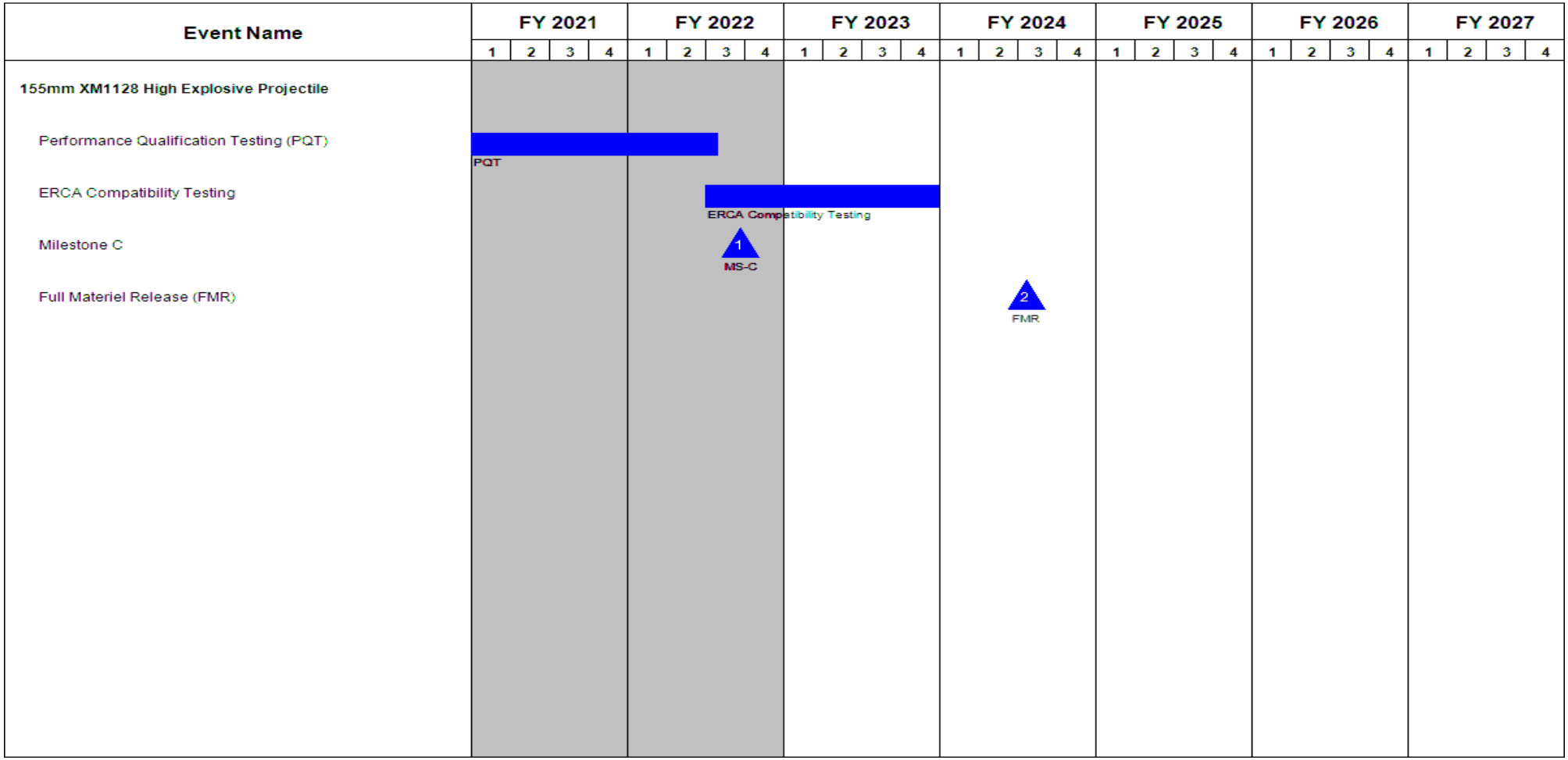
Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(NSWC) ? Dahlgren : Dahlgren, VA													
XM1128 Testing	MIPR	National Technical Systems (NTS) : Camden, AR	0.817	-		-		-		-		-	0.000	0.817	-
M999 Testing	MIPR	Combating Terrorism Technical Support Office (CTTSO) : Alexandria, VA	1.770	-		-		-		-		-	0.000	1.770	-
XM1128 Testing	MIPR	Army Research Lab (ARL) : Adelphi, MD	0.075	-		-		-		-		-	0.000	0.075	-
		Subtotal	8.826	2.810		-		-		-		-	0.000	11.636	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	47.062	15.000		-		-		-		-	1.517	63.579	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU7 / *Enhanced Lethality Cannon Munitions*



Note

FY 2021 Congressional Add funding is supporting the completion of XM1128 Engineering Manufacturing and Development activities and Extended Range Cannon Artillery (ERCA) weapon system and propulsion compatibility activities.

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU7 / *Enhanced Lethality Cannon Munitions*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
155mm XM1128 High Explosive Projectile	3	2017	1	2023
Performance Qualification Testing (PQT)	2	2019	3	2022
ERCA Compatibility Testing	3	2022	4	2023
Milestone C	3	2022	3	2022
Full Materiel Release (FMR)	3	2024	3	2024
M999	4	2018	4	2019
M999 Testing	4	2018	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU8 / *Improved Multi-Option Fuze*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EU8: *Improved Multi-Option Fuze*	-	7.700	4.562	-	-	-	-	-	-	-	0.000	12.262
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. This Project does not have a Fiscal Year (FY) 2023 budget request.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Improved Multi-Option Fuze Development ***Description:*** Develop and qualify improved multi-option fuze technologies. ***FY 2022 Plans:*** FY 2022 funding supports 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease is based on a projected decline in requirements in FY 2023.	7.700	4.395	-
Title: FY 2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.167	-
Accomplishments/Planned Programs Subtotals	7.700	4.562	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU8 / *Improved Multi-Option Fuze*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E99909: *Multi-Option Fuze, Artillery M782*	-	13.653	0.000	-	0.000	-	-	-	-	0.000	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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU8 / *Improved Multi-Option Fuze*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	1.033	-		-		-		-		-	0.000	1.033	-
FY 2022 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.167		-		-		-	0.000	0.167	-
		Subtotal	1.033	-		0.167		-		-		-	0.000	1.200	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MOFA II Development & PQT Support	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	11.470	5.232	Jan 2021	0.350	Nov 2021	-		-		-	0.000	17.052	-
iMOFM Fuze Test Hardware & Qualification	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	2.332	-		0.478	Jan 2022	-		-		-	0.000	2.810	-
		Subtotal	13.802	5.232		0.828		-		-		-	0.000	19.862	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	3.936	1.517	Nov 2020	1.217	Nov 2021	-		-		-	0.000	6.670	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU8 / *Improved Multi-Option Fuze*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fuze Engineering Support	C/LH	SAVIT Corporation : Rockaway, NJ	-	-		0.150	May 2022	-		-		-	0.000	0.150	-
		Subtotal	3.936	1.517		1.367		-		-		-	0.000	6.820	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-	-		0.250	Dec 2021	-		-		-	0.000	0.250	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.464	0.631	Mar 2021	1.250	Jan 2022	-		-		-	0.000	2.345	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	U.S. Army Research Lab (ARL) : Adelphi, MD	0.400	-		-		-		-		-	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	-		0.120	Nov 2021	-		-		-	0.000	0.160	-
Improved Multi-Option Fuze Test and Evaluations	MIPR	White Sands Missile Range (WSMR) : White Sands, NM	0.315	0.320	Jan 2022	0.330	Dec 2021	-		-		-	0.000	0.965	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EU8 / *Improved Multi-Option Fuze*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Multi-Option Fuze Cyber Security Testing	MIPR	TBD : TBD	-	-		0.250	Mar 2022	-		-		-	0.000	0.250	-
		Subtotal	1.219	0.951		2.200		-		-		-	0.000	4.370	N/A

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 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	19.990	7.700		4.562		-		-		-	0.000	32.252	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU8 / *Improved Multi-Option Fuze*

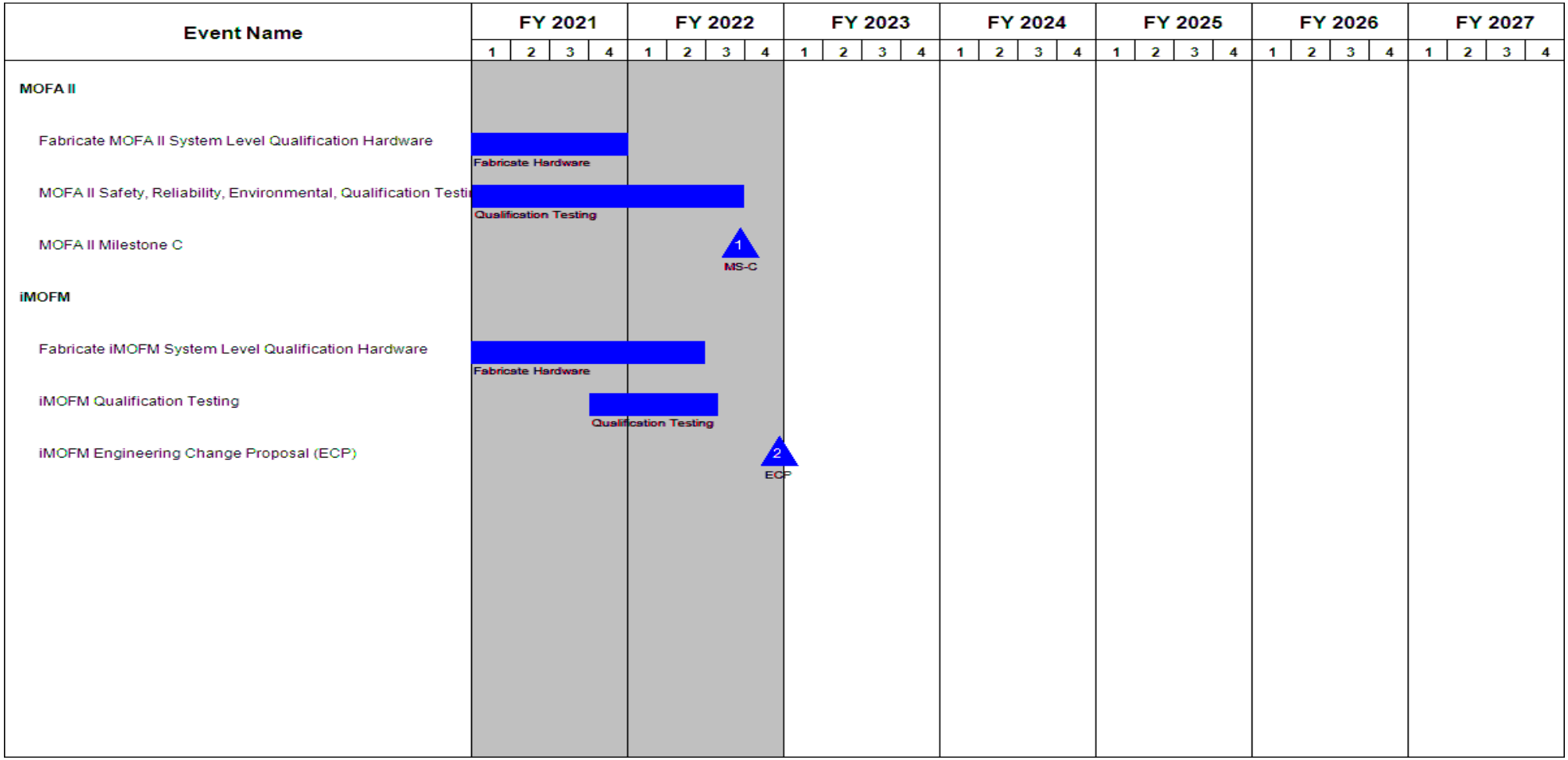


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EU8 / *Improved Multi-Option Fuze*

Schedule Details

	Start		End	
Events	**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)

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EW1 / *40mm Low Velocity Ammunition*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EW1: *40mm Low Velocity Ammunition*	-	20.259	3.640	2.045	-	2.045	2.157	2.951	-	-	0.000	31.052
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 counter-defilade 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 2023 activities will include the continuation of Developmental Test & Evaluation (DT&E), support for Milestone C, execution of an additional Soldier Touch Point (STP 4) and the award of a follow on Low Rate Initial Production (LRIP) contract.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: 40mm LV HEAB, XM1166	20.259	3.508	2.045
Description: Engineering Manufacturing Development (EMD) of the 40mm LV HEAB munition. ***FY 2022 Plans:*** FY 2022 activities will include conducting Developmental Test & Evaluation (DT&E) testing and Solider Touch Point 3 (STP 3). ***FY 2023 Plans:*** FY 2023 activities will include the continuation of Developmental Test & Evaluation (DT&E), support for Milestone C, execution of an additional Soldier Touch Point (STP 4) and the award of a follow on Low Rate Initial Production (LRIP) contract. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in funding from FY 2022 to FY 2023 is attributed to subsystem design and testing in preparation for DT&E in FY 2022 - 2023. Program enters Low Rate Initial Production in FY 2024.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	-	0.132	-
FY 2022 Plans: FY 2022 funding to be assessed per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EW1 / *40mm Low Velocity Ammunition*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.			
Accomplishments/Planned Programs Subtotals	20.259	3.640	2.045

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E71005: *CTG, 40MM, LV HEAB, XM1166*	-	10.500	13.888	-	13.888	-	-	-	-	0.000	24.388

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 Developmental Test & Evaluation (DT&E). After DT&E and a successful Milestone C, the Government will award a single contract for Low Rate Initial Production (LRIP) and four production year options utilizing a follow-on Federal Acquisition Regulation (FAR) based contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EW1 / *40mm Low Velocity Ammunition*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	various : various	-	-		0.132	Mar 2022	-		-		-	0.000	0.132	-
		Subtotal	-	-		0.132		-		-		-	0.000	0.132	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV HEAB XM1166 Contractor 1	C/CPFF	Day & Zimmerman, Inc (DZI) : Middletown, IA	14.479	7.700	Jan 2021	1.000	Jan 2022	-		-		-	Continuing	Continuing	Continuing
LV HEAB XM1166 Contractor 2	C/CPFF	Nammo Perry, Inc. : Perry, FL	11.240	7.700	Jan 2021	1.000	Jan 2022	-		-		-	Continuing	Continuing	Continuing
		Subtotal	25.719	15.400		2.000		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LV HEAB XM1166 - Engineering Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, NJ	3.804	3.759	Jan 2021	0.600	Nov 2021	-		-		-	Continuing	Continuing	Continuing
LV HEAB XM1166 - Lethality Analysis	MIPR	Data & Analysis Center (DAC) : Aberdeen Proving Ground, Md	-	-		0.100	Nov 2021	-		-		-	0.000	0.100	-
		Subtotal	3.804	3.759		0.700		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) EW1 / *40mm Low Velocity Ammunition*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-	-		0.707	Dec 2021	1.873	Jan 2023	-		1.873	0.000	2.580	-
Soldier Touch Point 3 & 4 (STP 3 & 4)	MIPR	Aberdeen Test Center (ATC) : Aberdeen, MD	-	-		0.101	Apr 2022	0.172	Apr 2022	-		0.172	0.000	0.273	-
		Subtotal	-	1.100		0.808		2.045		-		2.045	0.000	3.953	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	29.523	20.259		3.640		2.045		-		2.045	Continuing	Continuing	N/A

Remarks

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

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EW1 / *40mm Low Velocity Ammunition*

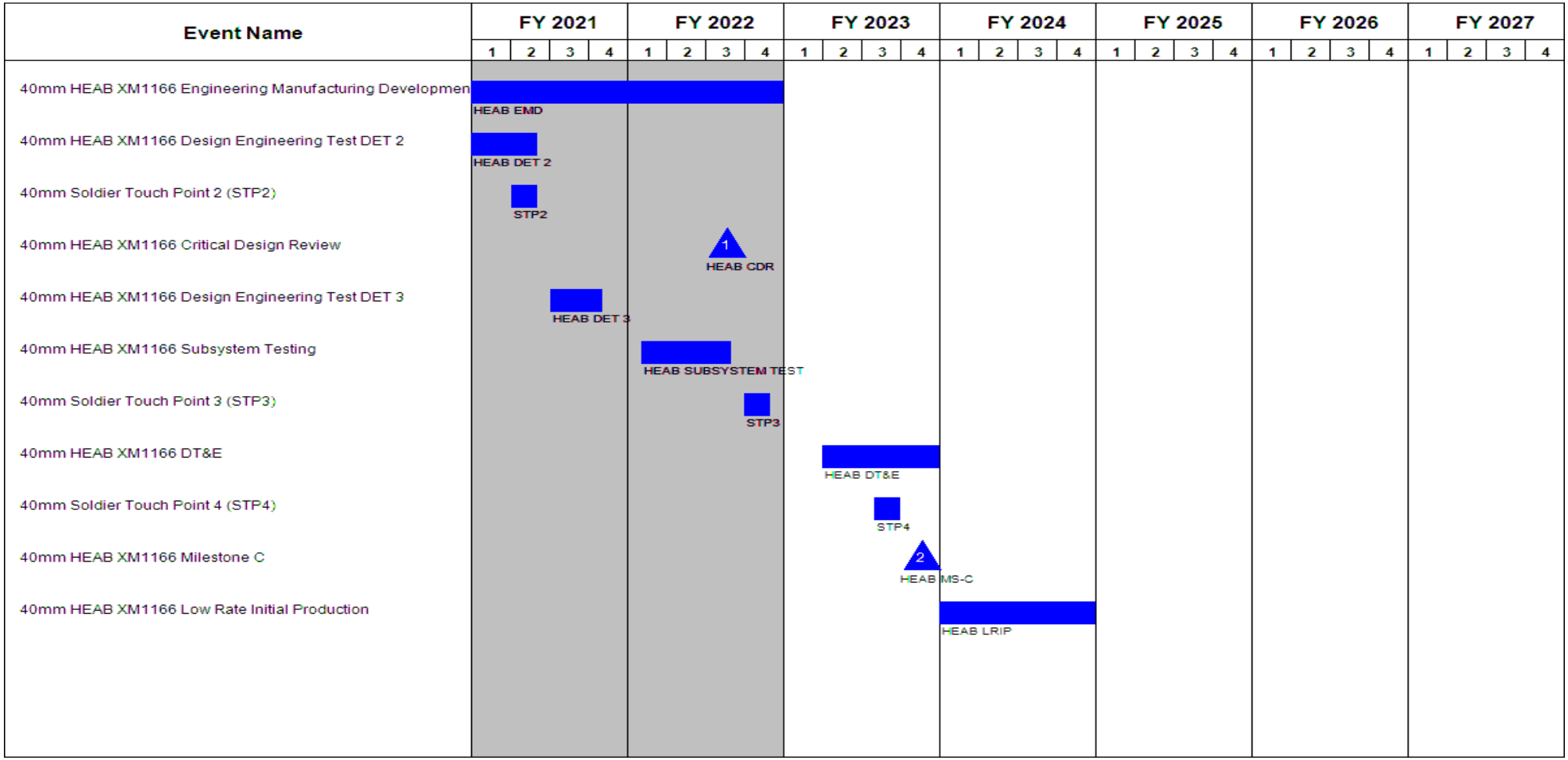


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** EW1 / *40mm Low Velocity Ammunition*

Schedule Details

	Start		End	
Events	**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	3	2022	3	2022
40mm HEAB XM1166 Design Engineering Test DET 3	3	2021	4	2021
40mm HEAB XM1166 Subsystem Testing	1	2022	3	2022
40mm Soldier Touch Point 3 (STP3)	4	2022	4	2022
40mm HEAB XM1166 DT&E	2	2023	4	2023
40mm Soldier Touch Point 4 (STP4)	3	2023	3	2023
40mm HEAB XM1166 Milestone C	4	2023	4	2023
40mm HEAB XM1166 Low Rate Initial Production	1	2024	4	2024

Note

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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FA6 / *30mm Lethality*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FA6: *30mm Lethality*	-	22.359	8.939	8.653	-	8.653	3.078	-	-	-	0.000	43.029
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) 2023 funding will support the continuation of Engineering, Manufacturing and Development (EMD) for all cartridges to include completion of Developmental Test & Evaluation (DT&E), preparation and execution of Milestone C decision, platform integration testing, and Live Fire Test & Evaluation (LFT&E) hardware fabrication and test assets.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: 30X173mm Armor-Piercing Fin-Stabilized Discarding with Sabot Trace (APFSDS-T) and Target Practice Discarding Sabot with Trace (TPDS-T)	12.654	3.149	3.653
Description: Qualify 30x173mm armor piercing tactical and training cartridges for use on Stryker ICV, NGCV or other Army Future Fighting Vehicles.			
FY 2022 Plans: FY 2022 primary activities will include Developmental Test & Evaluation (DT&E) hardware fabrication and testing and preparation for Milestone C decision.			
FY 2023 Plans: FY 2023 primary activities will include Live Fire Test & Evaluation (LFT&E) hardware fabrication/test assets and conducting Milestone C decision.			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 funding increases due to additional engineering support required for Milestone C preparation and execution. Remaining activities will include hardware build for LFT&E and conducting Milestone C review.			
Title: 30x173mm HEAB-T and TP-T ***Description:*** 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. ***FY 2022 Plans:*** FY 2022 funding to be assessed per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). FY 2022 primary activities will include DT&E testing and preparation for Milestone C decision. ***FY 2023 Plans:*** FY 2023 primary activities will include integration testing, conducting Milestone C decision, and Live Fire Test & Evaluation (LFT&E) hardware fabrication/test assets. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023. FY 2023 funding decreases due to DT&E cartridge build and test completion in FY 2022. Remaining activities will only include platform integration testing, conducting Milestone C review, and hardware build for LFT&E.	9.705	5.464	5.000
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) ***FY 2022 Plans:*** FY 2022 funding to be assessed per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.	-	0.326	-
Accomplishments/Planned Programs Subtotals	22.359	8.939	8.653

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E07610: *CTG, 30MM, Progrmabl Air Burst Mun, Mk310, Linked*	-	-	8.910	-	8.910	23.340	20.629	21.027	20.735	0.000	94.641
• E07306: *CTG, 30mm TP-T, MK239, Single*	-	0.826	30.439	-	30.439	37.790	38.465	39.175	39.497	0.000	186.192

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E07406: *CTG, 30mm Hi Expl Incendry-T(HEI-T), Mk238 Series*	-	-	8.603	-	8.603	10.853	7.320	7.358	7.399	0.000	41.533
• E09191: *CTG, 30mm TPDS-T, MK317 (SABOT Trng), Single*	-	6.000	32.078	-	32.078	61.659	62.941	64.417	65.781	0.000	292.876
• E09292: *CTG, 30mm APFSDS-T, MK258, Single*	2.564	7.000	37.133	-	37.133	46.197	41.645	36.497	34.103	0.000	205.139

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) to support development, Design Engineering Tests (DET) and down-select to one contract for 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 down-select to one contract for 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 contracts for the XM1182 HEAB-T and XM1173 TP-T cartridge.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FA6 / *30mm Lethality*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.326		-		-		-	0.000	0.326	-
		Subtotal	-	-		0.326		-		-		-	0.000	0.326	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
High Explosive Airburst with Trace (HEAB-T) EMD Contract 1	C/CPFF	General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL	8.868	-		0.560	Jan 2022	-		-		-	0.000	9.428	-
High Explosive Airburst with Trace (HEAB-T) EMD Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	10.997	6.066	Apr 2021	0.560	Jan 2022	-		-		-	0.000	17.623	-
High Explosive Airburst with Trace (HEAB-T) LFTE Assets	C/FFP	TBD : TBD	-	-		-		1.000	Jan 2023	-		1.000	0.000	1.000	-
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	1.749	Aug 2021	0.280	Jan 2022	-		-		-	0.000	5.304	-
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) EMD Contract 2	C/CPFF	Northrop Grumman Information Systems (NGIS) : Plymouth, MN	7.306	9.117	Feb 2021	0.534	Jan 2022	-		-		-	0.000	16.957	-
Armor Piercing Fin Stabilized Discarding Sabot with Trace (APFSDS-T) LFTE	C/FFP	TBD : TBD	-	-		-		0.800	Jan 2023	-		0.800	0.000	0.800	-
		Subtotal	30.446	16.932		1.934		1.800		-		1.800	0.000	51.112	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FA6 / *30mm Lethality*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Development Command - Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	7.200	1.761	Jan 2021	2.000	Nov 2021	3.500	Nov 2022	-		3.500	Continuing	Continuing	Continuing
APFSDS-T / TPSD-T DAC Support	MIPR	Development Command - Data Analysis Center (DEVCOM DAC) : Aberdeen Proving Ground, MD	-	0.272	Apr 2021	-		-		-		-	0.000	0.272	-
		Subtotal	7.200	2.033		2.000		3.500		-		3.500	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-	0.665	Mar 2021	-		-		-		-	0.000	0.665	-
APFSDS-T / TPSD-T Surrogate Test	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	0.091	Mar 2021	-		-		-		-	0.000	0.091	-
APFSDS-T / TPSD-T Developmental Test & Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		1.335	Mar 2022	-		-		-	0.000	1.335	-
APFSDS-T Live Fire Test & Evaluation (LFTE) Test	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		-		1.353	Jul 2023	-		1.353	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FA6 / *30mm Lethality*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HEAB-T / TP-T Urban Wall Targets	MIPR	Redstone Test Center (RTC) : Redstone Arsenal, AL	-	0.594	Nov 2021	-		-		-		-	0.000	0.594	-
HEAB-T / TP-T E3 Testing	MIPR	White Sands Missile Range (WSMR) : White Sands Missile Range, NM	-	0.349	Nov 2021	-		-		-		-	0.000	0.349	-
HEAB-T Design Engineering Tests (DET)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	1.695	Feb 2021	-		-		-		-	0.000	1.695	-
HEAB-T / TP-T Developmental Test & Evaluation (DT&E)	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		3.344	Jan 2022	-		-		-	0.000	3.344	-
HEAB-T Platform Integration and Live Fire Test & Evaluation (LFTE) Test	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		-		2.000	Jul 2023	-		2.000	Continuing	Continuing	Continuing
		Subtotal	-	3.394		4.679		3.353		-		3.353	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	37.646	22.359		8.939		8.653		-		8.653	Continuing	Continuing	N/A

Remarks

Design Engineering Tests (DET)
Engineering and Manufacturing Development (EMD)

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

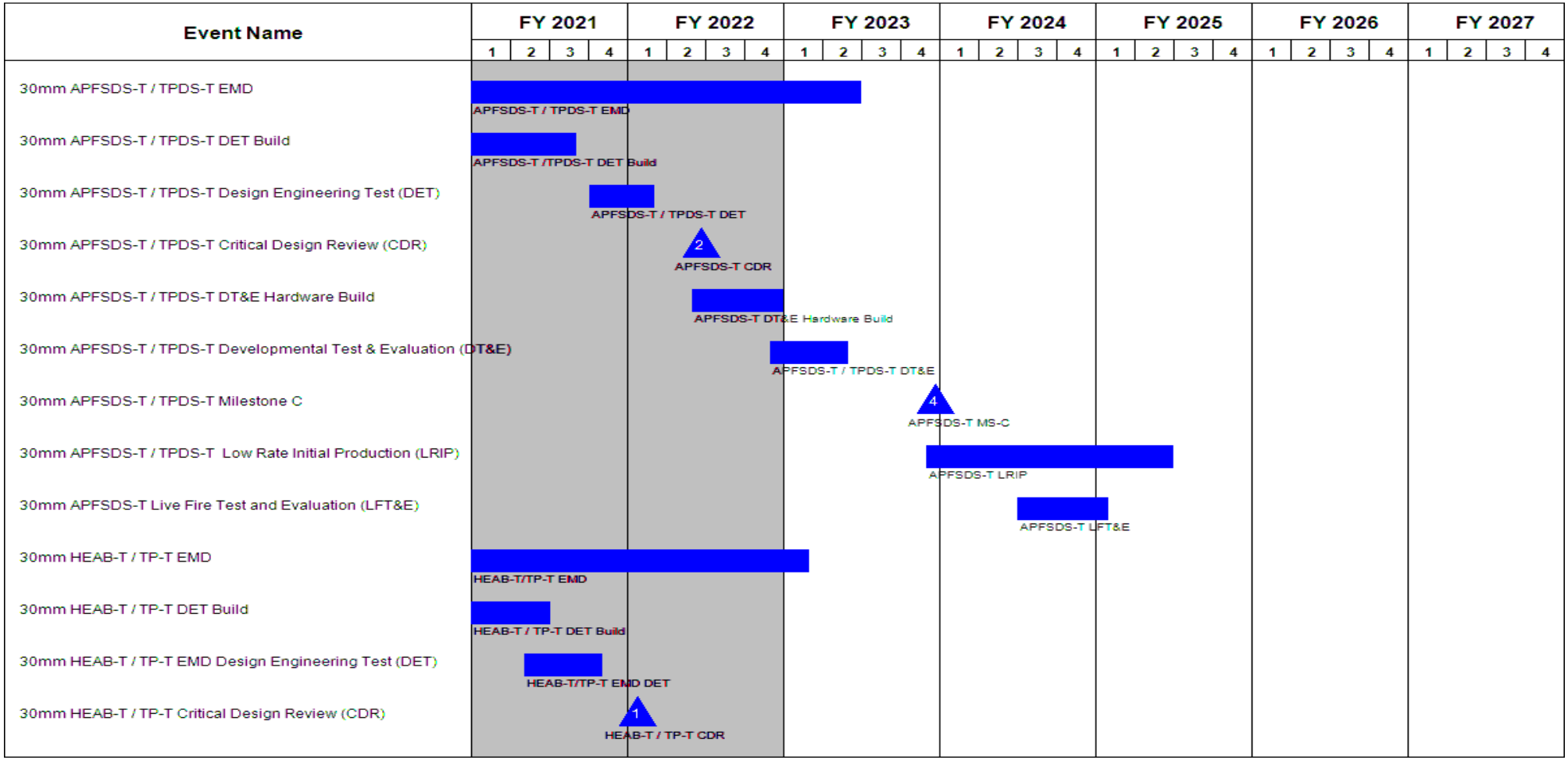


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

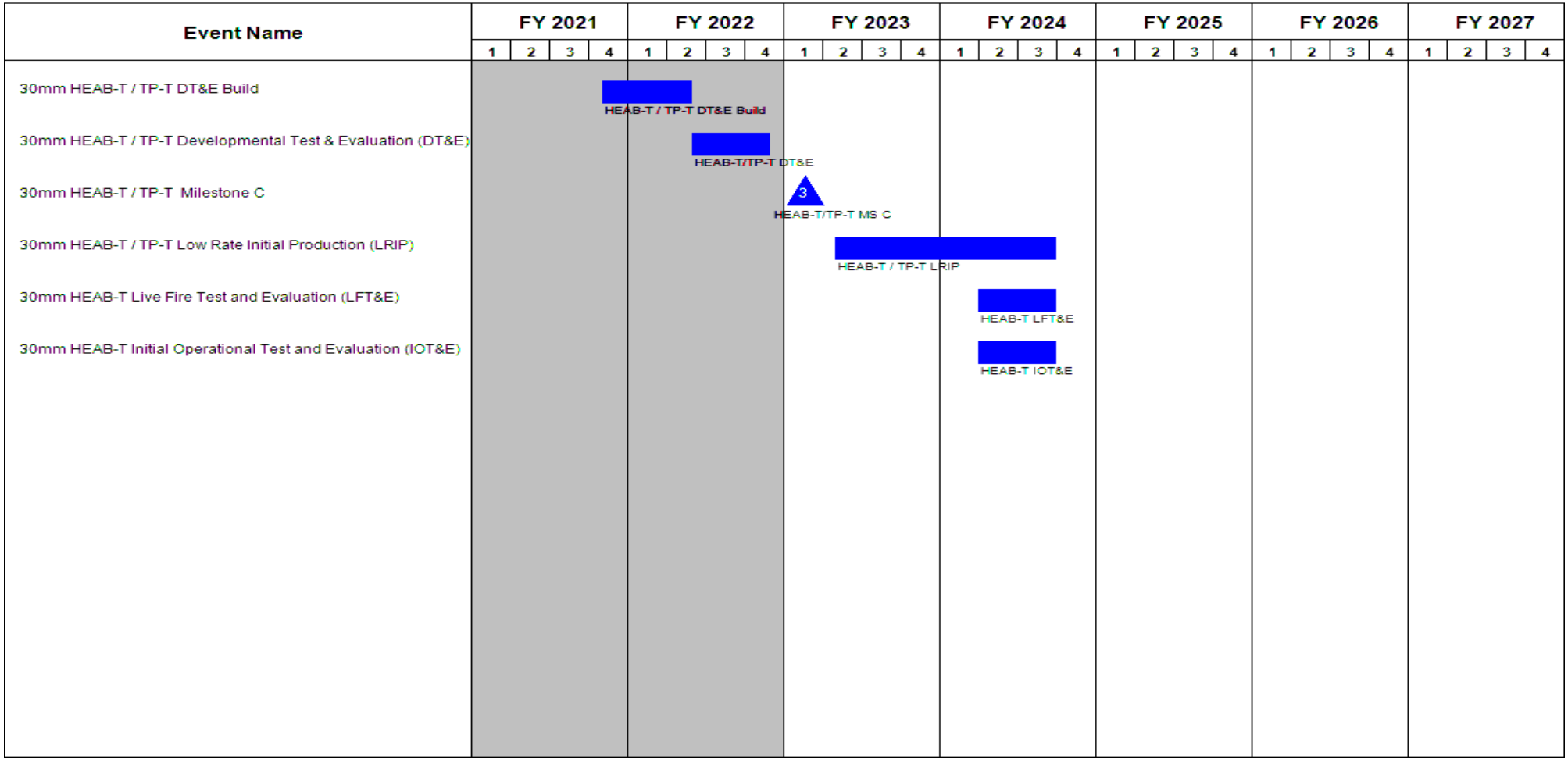


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Materiel 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	2	2023
30mm APFSDS-T / TPDS-T DET Build	2	2020	3	2021
30mm APFSDS-T / TPDS-T Design Engineering Test (DET)	4	2021	1	2022
30mm APFSDS-T / TPDS-T Critical Design Review (CDR)	2	2022	2	2022
30mm APFSDS-T / TPDS-T DT&E Hardware Build	2	2022	4	2022
30mm APFSDS-T / TPDS-T Developmental Test & Evaluation (DT&E)	4	2022	2	2023
30mm APFSDS-T / TPDS-T Milestone C	4	2023	4	2023
30mm APFSDS-T / TPDS-T Low Rate Initial Production (LRIP)	4	2023	2	2025
30mm APFSDS-T Live Fire Test and Evaluation (LFT&E)	3	2024	1	2025
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 / TP-T Milestone B	2	2020	2	2020
30mm HEAB-T / TP-T EMD Contract Award	3	2020	3	2020
30mm HEAB-T / TP-T EMD	3	2020	1	2023
30mm HEAB-T / TP-T DET Build	2	2020	2	2021
30mm HEAB-T / TP-T EMD Design Engineering Test (DET)	2	2021	4	2021
30mm HEAB-T / TP-T Critical Design Review (CDR)	1	2022	1	2022
30mm HEAB-T / TP-T DT&E Build	4	2021	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FA6 / *30mm Lethality*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
30mm HEAB-T / TP-T Developmental Test & Evaluation (DT&E)	2	2022	4	2022
30mm HEAB-T / 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)

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FJ4: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	-	20.079	85.997	92.402	-	92.402	86.869	70.359	55.644	56.185	0.000	467.535
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) 2023 funding will continue to support the development and testing of the selected C-DAEM Armor solution(s) for Urgent Materiel Release (UMR) and engineering efforts required to integrate the NavStorm-M (M-Code) 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. The Army has approved the Israeli M999 advanced anti-personnel munition, now designated the U.S. model XM1208, as the C-DAEM DPICM Replacement solution. FY 2023 funding will support the completion of XM1208 qualification activities and support engineering efforts to evaluate test data to ensure DoD policy compliance and that the round is 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)	FY 2021	FY 2022	FY 2023
Title: C-DAEM Armor	-	76.773	88.258
Description: C-DAEM Armor will destroy moved and moving self-propelled howitzers, infantry fighting vehicles and tanks.			
FY 2022 Plans: FY 2022 funding supports 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).			
FY 2023 Plans: FY 2023 funding will continue to support the development and testing of the selected C-DAEM Armor solution(s) for Urgent Materiel Release (UMR) and engineering efforts required to integrate the NavStorm-M (M-Code) Global Positioning System (GPS) Receiver into the most promising C-DAEM Armor objective materiel solution(s).			
FY 2022 to FY 2023 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Increase in funding in FY 2023 due to increase in contract costs associated with C-DAEM Armor development and qualification efforts for selected solution(s) to support UMR and NavStorm-M (M-Code) GPS Receiver integration efforts.			
Title: C-DAEM DPICM Replacement ***Description:*** C-DAEM DPICM Replacement will destroy personnel to soft-skinned targets. The Army has approved the Israeli M999 advanced anti-personnel munition, now designated the US model XM1208, as the C-DAEM DPICM Replacement solution. ***FY 2022 Plans:*** FY 2022 funding supports XM1208 testing and qualification activities to ensure effectiveness, suitability and survivability. ***FY 2023 Plans:*** FY 2023 funding will support the completion of XM1208 qualification activities and support engineering efforts to evaluate test data to ensure DoD policy compliance and that the round is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in funding due to the completion of initial XM1208 test and qualification activities.	20.079	6.082	4.144
Title: FY 2022 SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	3.142	-
Accomplishments/Planned Programs Subtotals	20.079	85.997	92.402

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• FG1: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	38.466	-	0.000	-	0.000	-	-	-	-	Continuing	Continuing
• F90112: *PROJ, ARTY, 155MM C-DAEM ARMOR*	-	-	46.857	-	46.857	71.368	199.334	232.036	232.036	0.000	781.631

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost

Remarks

In FY 2022, Project FJ4 Cannon-Delivered Area Effects Munitions (C-DAEM) transitioned from BA 4 PE 0603639A Tank and Medium Caliber Ammunition Project FG1 C-DAEM.

A Procurement of Ammunition, Army (PAA) funding line for C-DAEM Armor, Standard Study Number (SSN), F90112, PROJ, ARTY, 155MM C-DAEM ARMOR, 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

The C-DAEM Program of Record is employing an evolutionary acquisition approach to efficiently address anti-armor, extended range capability requirements and deliver DOD unexploded ordnance (UXO) policy compliant munitions.

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. C-DAEM Armor used the selection criteria to sponsor competitive demonstrations for C-DAEM Armor to streamline the acquisition process. The U.S. Government has selected the most promising candidate(s) that will address medium to heavy armored targets in support of an Urgent Materiel Release (UMR) and will select the most promising candidate(s) to support Full Materiel Release (FMR). C-DAEM Armor is utilizing competitively awarded Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreements (OTA) to further support development and testing of the selected C-DAEM Armor candidate(s) in accordance with the decisions granted at the Army Requirements Oversight Council (AROC) in April 2018. C-DAEM Armor is also utilizing competitively awarded DOTC OTAs to complete development and qualification activities, including the NavStorm-M (M-Code) 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 an Irregular Warfare Technical Support Directorate (IWTSD), formerly known as Combating Terrorism Technical Support Office (CTTSO), task plan with Israel Ministry of Defense (IMOD) to deliver XM1208 hardware in support of qualification activities in accordance with decisions granted at the AROC in September 2020.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-	0.027	Jul 2021	0.450	Oct 2021	0.450	Oct 2022	-		0.450	0.000	0.927	-
FY 2022 SBIR/STTR Transfer	TBD	Various : Various	-	-		3.142		-		-		-	0.000	3.142	-
		Subtotal	-	0.027		3.592		0.450		-		0.450	0.000	4.069	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	75.945	Nov 2022	-		75.945	0.000	142.945	-
DOTC - Armor NavStorm-M GPS Receiver Integration	MIPR	DoD Ordnance Technology Consortium (DOTC) : Picatinny Arsenal, NJ	-	-		4.553	Nov 2021	4.010	Nov 2022	-		4.010	0.000	8.563	-
CTTSO - DPICM Replacement Hardware	MIPR	Combating Terrorism Technical Support Office (CTTSO) : Israel Ministry of Defense (IMOD)	-	14.904	Mar 2021	-		-		-		-	0.000	14.904	-
		Subtotal	-	14.904		71.553		79.955		-		79.955	0.000	166.412	N/A

Remarks

Increase in C-DAEM Armor EMD contract costs due to additional hardware required to support qualification testing.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	2.646	Nov 2020	6.748	Nov 2021	6.153	Nov 2022	-		6.153	0.000	15.547	-
Fire Control Software Update	MIPR	Multiple : Various	-	2.502	May 2021	1.104	May 2022	-		-		-	0.000	3.606	-
		Subtotal	-	5.148		7.852		6.153		-		6.153	0.000	19.153	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Armor Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	-		1.500	Mar 2022	2.500	Mar 2023	-		2.500	0.000	4.000	-
DPICM Replacement Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	-		1.500	Mar 2022	3.344	Mar 2023	-		3.344	0.000	4.844	-
		Subtotal	-	-		3.000		5.844		-		5.844	0.000	8.844	N/A

Remarks

Increase in C-DAEM Armor test costs to support additional activities required to achieve Urgent Materiel Release.
Increase in C-DAEM DPICM Replacement test costs to support the completion of qualification activities that establish reliability as well as environmental testing to confirm that the XM1208 projectile is safe, suitable and operationally effective.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	20.079		85.997		92.402		-		92.402	0.000	198.478	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract

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.

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

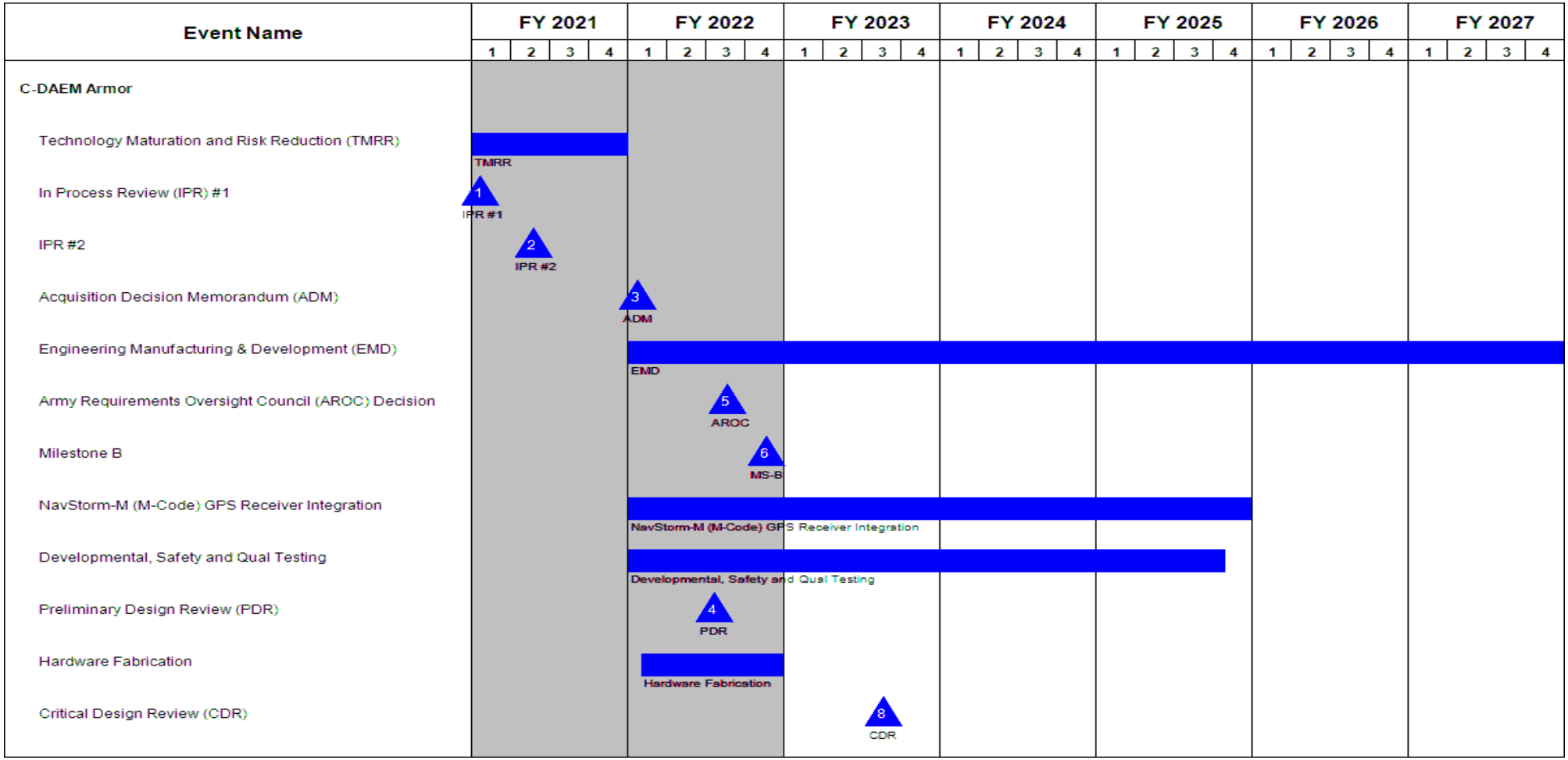


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

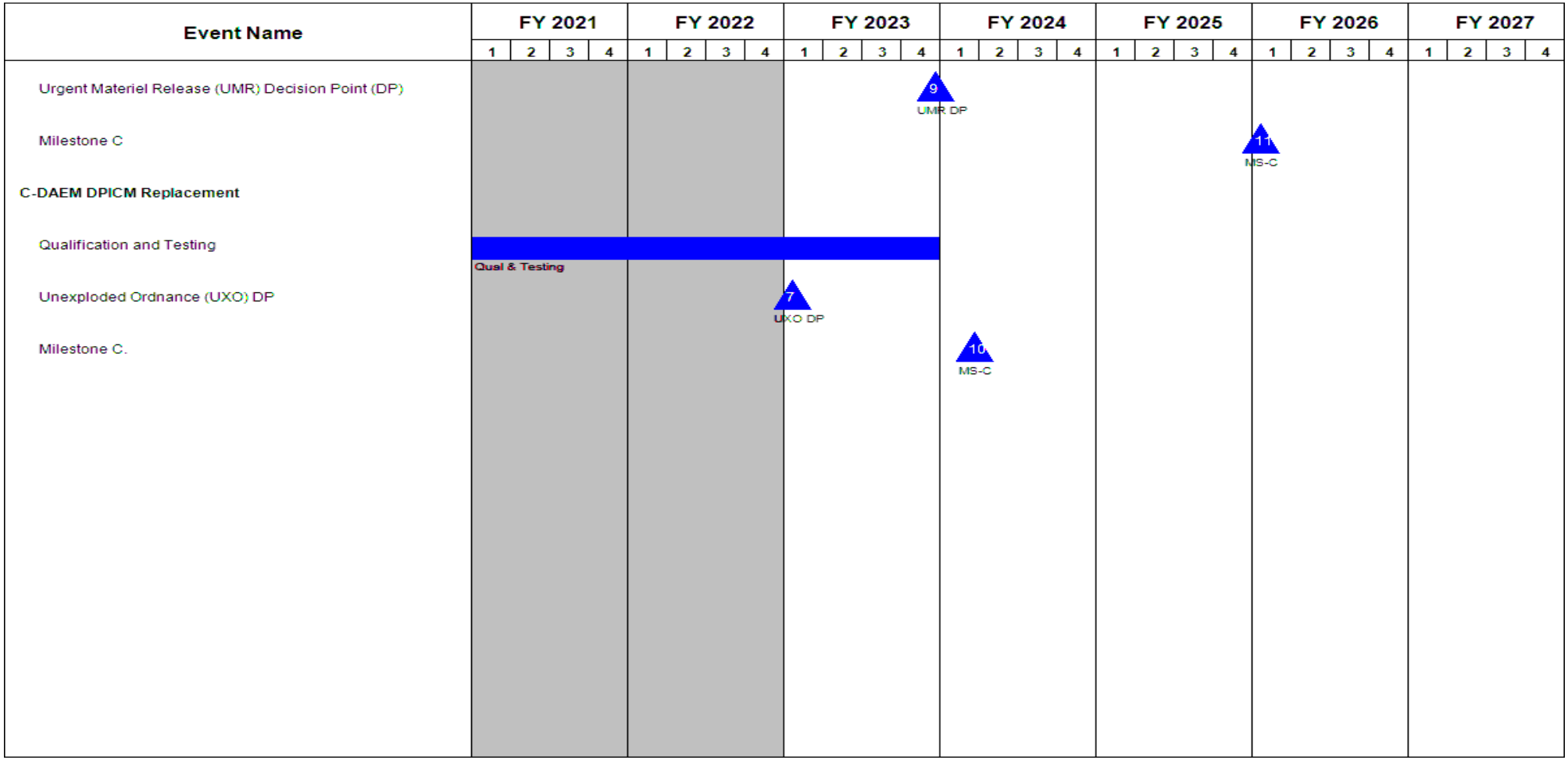


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

Note

In 1QFY22, the Milestone Decision Authority for C-DAEM Armor signed an Acquisition Decision Memorandum (ADM) approving the initiation of Engineering Manufacturing and Development (EMD) and Urgent Materiel Release qualification activities. The U.S. Government has selected the most promising candidate(s) that will address medium to heavy armored targets in support of UMR and will select the most promising candidate(s) to support Full Materiel Release (FMR).

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FJ4 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

Schedule Details

	Start		End	
Events	**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
Acquisition Decision Memorandum (ADM)	1	2022	1	2022
Engineering Manufacturing & Development (EMD)	1	2022	4	2027
Army Requirements Oversight Council (AROC) Decision	3	2022	3	2022
Milestone B	4	2022	4	2022
NavStorm-M (M-Code) GPS Receiver Integration	1	2022	4	2025
Developmental, Safety and Qual Testing	1	2022	4	2025
Preliminary Design Review (PDR)	3	2022	3	2022
Hardware Fabrication	1	2022	4	2022
Critical Design Review (CDR)	3	2023	3	2023
Urgent Materiel Release (UMR) Decision Point (DP)	4	2023	4	2023
Milestone C	1	2026	1	2026
C-DAEM DPICM Replacement	1	2021	4	2022
Qualification and Testing	1	2021	4	2023
Unexploded Ordnance (UXO) 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.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FL4: *Small Caliber Ammo for Next Gen Squad Weapons*	-	26.483	28.372	25.558	-	25.558	12.058	12.168	12.172	12.291	0.000	129.102
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The total cost of the Small Caliber Ammo for Next Gen Squad Weapons Middle Tier of Acquisition effort is $132.0M million RDTE from FY2019 to FY2026. The remaining $11.8M in FY2027 is fully funded across the Future Years Defense Program (FYDP).

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) 2023 funding supports performing optimization efforts on the GP variant. FY 2023 also supports continuing rapid prototyping for the SP projectile, manufacturing prototype ammunition required for Developmental Testing (DT), and conducting DT. FY 2023 supports continuing rapid prototyping efforts to develop RRA and RRA-Tracer for the NGSW, continuing weapon and cartridge integration efforts, and executing projectile optimization efforts. FY 2023 also supports continuing rapid prototyping effort to develop tracer ammunition for the NGSW, building and testing tracer ammunition prototypes, and maturing/refining down-selected tracer ammunition design. FY 2023 supports continuing rapid prototyping effort to mature the Blank ammunition and activities to accelerate the development/maturation of Blank ammunition designs. FY 2023 also supports continuing 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 2023 also supports continuing the refining and development of the DDI and HPT cartridges.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Rapid Prototyping GP	7.983	0.500	2.012
Description: Develop, demonstrate, and qualify new ammunition for the NGSW systems.			
FY 2022 Plans: Complete GP rapid prototyping/development effort and begin GP optimization efforts.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Continue GP optimization efforts and conduct developmental tests. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding is increased for optimization and developmental test efforts for general purpose variant in FY 2023.			
Title: Rapid Prototyping SP ***Description:*** Develop, demonstrate, and qualify new ammunition to defeat hard targets for the NGSW systems. ***FY 2022 Plans:*** Continuing rapid prototyping for the Special Purpose (SP) projectile, manufacture prototype ammunition required for safety testing, and conduct safety testing. ***FY 2023 Plans:*** Continuing rapid prototyping for the Special Purpose (SP) projectile, manufacture prototype ammunition required for developmental testing, and conduct developmental tests. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding is decreased in FY 2023 to support developmental test activities.	12.500	10.164	2.700
Title: Rapid Prototyping Reduced Range Ammunition (RRA) for NGSW ***Description:*** 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. ***FY 2022 Plans:*** 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. ***FY 2023 Plans:*** Continue rapid prototyping effort to develop RRA and RR Tracer ammunition for the NGSW, continue weapon and cartridge integration efforts, and execute projectile optimization efforts. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increased in FY 2023 to support prototyping and risk reduction efforts.	3.500	8.000	10.700
Title: Rapid Prototyping Tracer Ammunition for NGSW	1.500	4.000	3.396

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: 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. ***FY 2022 Plans:*** 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. ***FY 2023 Plans:*** Continue rapid prototyping effort to develop tracer ammunition for the NGSW, build and test tracer ammunition prototypes, and mature/refine down-selected tracer ammunition design. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding reduced for Planned Tracer development activities in FY 2023.			
Title: Concept Evaluation of other NGSW Ammunition Variants ***Description:*** Concept development/evaluation of follow-on variants / ammunition for the NGSW.	1.000	-	-
Title: Rapid Prototyping Blank Ammo ***Description:*** 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. ***FY 2022 Plans:*** Continue rapid prototyping effort to mature the Blank ammunition and perform activities to accelerate the development/maturation of Blank ammunition designs. ***FY 2023 Plans:*** Continue rapid prototyping effort to mature the Blank ammunition and perform activities to accelerate the development/maturation of Blank ammunition designs. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increased funding for planned Blank Ammunition development activities in FY 2023.	-	2.000	2.500
Title: Rapid Prototyping CCMCK Training Ammo ***Description:*** 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.	-	2.122	2.500

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: 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. ***FY 2023 Plans:*** Continue 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increased for planned CCMCK training ammunition activities in FY 2023.			
Title: Rapid Prototyping DDI and HPT Cartridges ***Description:*** Rapid prototyping effort to develop and field DDI and HPT cartridges NGSW weapon systems. ***FY 2022 Plans:*** 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. ***FY 2023 Plans:*** Continue 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding increase for planned DDI and HPT cartridge activities in FY 2023.	-	0.550	1.750
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) ***FY 2022 Plans:*** FY 2022 funding to be assess per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Allocation of FY 2022 SBIR/STTR was added. FY 2023 SBIR/STTR transfer amount will be determined and assessed in FY 2023.	-	1.036	-
Accomplishments/Planned Programs Subtotals	26.483	28.372	25.558

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E06002: *NEXT GENERATION COMBAT ROUND*	14.386	59.496	23.523	-	23.523	36.816	39.040	71.884	71.876	0.000	317.021
• E06014: *NEXT GENERATION REDUCED RANGE ROUND*	-	4.807	74.209	-	74.209	110.093	115.058	171.792	171.792	0.000	647.751
• E06015: *NEXT GENERATION SQUAD WEAPON SPECIAL PURPOSE ROUND*	-	3.369	7.858	-	7.858	14.859	22.058	34.870	34.869	0.000	117.883
• E60011: *NEXT GENERATION BLANK ROUND*	-	3.562	23.072	-	23.072	34.378	34.590	65.720	65.720	0.000	227.042

Remarks

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	Various : Various	-	-		1.036	Mar 2022	-		-		-	0.000	1.036	-
		Subtotal	-	-		1.036		-		-		-	0.000	1.036	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Follow-on Ammo Prototypes/Concepts	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	0.200	Feb 2021	-		-		-		-	Continuing	Continuing	Continuing
Projectile and Ammo Development Contract General Purpose	Option/ CPFF	OLIN Winchester Corporation (LCAAP) : Independence, Missouri	1.740	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	-		-		-		-		-	0.000	7.189	-
Projectile and Ammo Development Contract Special Purpose	Option/ CPFF	OLIN Winchester Corporation (LCAAP) : Independence, Missouri	2.033	5.400	May 2021	5.000	Dec 2021	0.500	Dec 2022	-		0.500	Continuing	Continuing	Continuing
Ammo Development Support Special Purpose	Option/ CPFF	Concurrent Technologies Corporation (CTC) : Johnstown, Pennsylvania	0.862	-		-		-		-		-	0.000	0.862	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracer Ammunition Prototype Contract	Option/ CPFF	JAK Tool Engineering Solutions : Cranbury, New Jersey	-	0.750	May 2021	1.000	Jan 2022	1.200	Jan 2023	-		1.200	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	2.000	Jan 2023	-		2.000	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype Contract 2	Option/ FFP	OLIN Winchester Corporation : Independence, Missouri	-	1.000	Apr 2021	2.200	Jan 2022	-		-		-	Continuing	Continuing	Continuing
Reduced Range Ammo Development	Option/ CPFF	Concurrent Technologies Corporation (CTC) : Johnstown, Pennsylvania	-	-		-		0.500	Oct 2022	-		0.500	Continuing	Continuing	Continuing
Reduced Range Ammo Weapon Integration	TBD	To Be Determined : To Be Determined	-	-		-		4.500	Feb 2023	-		4.500	Continuing	Continuing	Continuing
General Purpose Optimization	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	-		0.500	Nov 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
Blank Ammo Development Contracts	TBD	To Be Determined : To Be Determined	-	-		1.000	Feb 2022	1.000	Feb 2023	-		1.000	Continuing	Continuing	Continuing
CCMCK Training Ammo Development Contracts	TBD	To Be Determined : To Be Determined	-	-		1.000	Feb 2022	1.000	Feb 2023	-		1.000	Continuing	Continuing	Continuing
DDI and HPT Development Contracts	TBD	To Be Determined : To Be Determined	-	-		0.400	Feb 2022	1.000	Feb 2023	-		1.000	Continuing	Continuing	Continuing
		Subtotal	11.824	10.750		13.300		12.200		-		12.200	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracer Ammunition Development and Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	0.350	May 2021	1.000	Feb 2022	1.446	Nov 2022	-		1.446	Continuing	Continuing	Continuing
Reduced Range Ammunition Prototype and Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	0.050	1.000	Dec 2020	1.700	Nov 2021	1.700	Nov 2022	-		1.700	Continuing	Continuing	Continuing
Projectile Development and Support General Purpose	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	2.080	2.083	Feb 2021	-		1.012	Nov 2022	-		1.012	0.000	5.175	-
Projectile Development and Support Special Purpose	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	5.150	Feb 2021	2.500	Nov 2021	1.700	Nov 2022	-		1.700	Continuing	Continuing	Continuing
Blank Ammo Development and Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	-		0.650	Nov 2021	1.000	Nov 2022	-		1.000	Continuing	Continuing	Continuing
Blank Ammo Development and Support	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		0.300	Nov 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
CCMCK Training Development and Support	MIPR	Development Command Armaments Center	-	-		0.647	Nov 2021	1.000	Nov 2022	-		1.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		(DEVCOM-AC) : Picatinny Arsenal, New Jersey													
CCMCK Training Ammo Development and Support	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		0.200	Nov 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
DDI and HPT Development and Support	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	-		0.150	Nov 2021	0.750	Nov 2022	-		0.750	Continuing	Continuing	Continuing
		Subtotal	2.130	8.583		7.147		9.608		-		9.608	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-		0.500	Jan 2023	-		0.500	Continuing	Continuing	Continuing
U.S. Army Aberdeen Test Center (ATC) Special Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	0.500	May 2021	-		0.500	Jan 2023	-		0.500	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing General Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	0.800	1.300	Nov 2020	-		-		-		-	0.000	2.100	-
Army Research Lab (ARL) Testing Special Purpose	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	1.250	Nov 2020	1.100	Dec 2021	-		-		-	Continuing	Continuing	Continuing
Tracer Ammunition Engineering Tests	MIPR	Development Command Armaments Center (DEVCOM-AC) :	-	0.400	May 2021	0.300	Dec 2021	-		-		-	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Picatinny Arsenal, New Jersey													
Reduced Range Ammunition Prototype Testing	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	0.500	Feb 2021	0.500	Dec 2021	1.000	Dec 2022	-		1.000	Continuing	Continuing	Continuing
Engineering Tests General Purpose	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	1.300	Feb 2021	-		-		-		-	0.000	1.300	-
Engineering Tests Special Purpose	MIPR	Development Command Armaments Center (DEVCOM-AC) : Picatinny Arsenal, New Jersey	-	1.000	Feb 2021	0.964	Nov 2021	-		-		-	Continuing	Continuing	Continuing
Safety Tests Special Purpose	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		0.500	Jan 2022	-		-		-	Continuing	Continuing	Continuing
Independent Tests Special Purpose	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		0.100	Apr 2022	-		-		-	Continuing	Continuing	Continuing
Independent Tests Reduced Range	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		0.100	Apr 2022	-		-		-	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing Reduced Range	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		1.000	Dec 2021	1.000	Dec 2022	-		1.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Independent Tests Tracer	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		0.100	Apr 2022	-		-		-	Continuing	Continuing	Continuing
Army Research Lab (ARL) Testing Tracer	MIPR	Aberdeen Proving Ground : Aberdeen, Maryland	-	-		1.000	Dec 2021	0.500	Dec 2022	-		0.500	Continuing	Continuing	Continuing
Engineering Tests Tracer	MIPR	U.S. Army Aberdeen Test Center (ATC) : Aberdeen, Maryland	-	-		0.900	Jan 2022	0.250	Jan 2023	-		0.250	Continuing	Continuing	Continuing
Blank Ammo Engineering Tests	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		0.050	Apr 2022	-		-		-	Continuing	Continuing	Continuing
CCMCK Training Ammo Engineering Tests BSO	MIPR	Joint Munitions Command/ Ballistics Services Organization : Independence, Missouri	-	-		0.075	Apr 2022	-		-		-	Continuing	Continuing	Continuing
CCMCK Training Ammo Engineering Tests ARL	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	-	-		0.200	Dec 2021	-		-		-	Continuing	Continuing	Continuing
		Subtotal	0.800	7.150		6.889		3.750		-		3.750	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	14.754	26.483		28.372		25.558		-		25.558	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

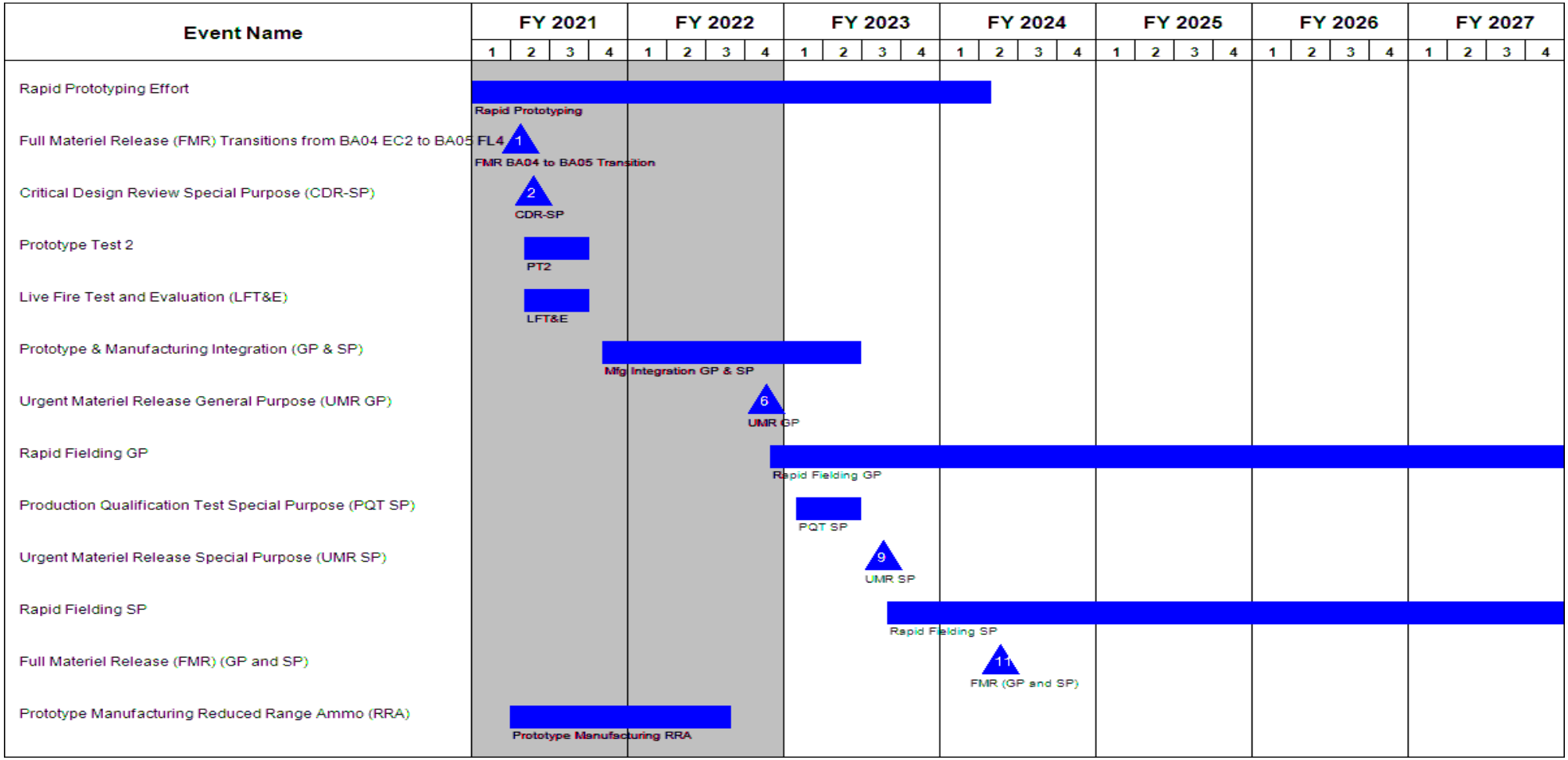

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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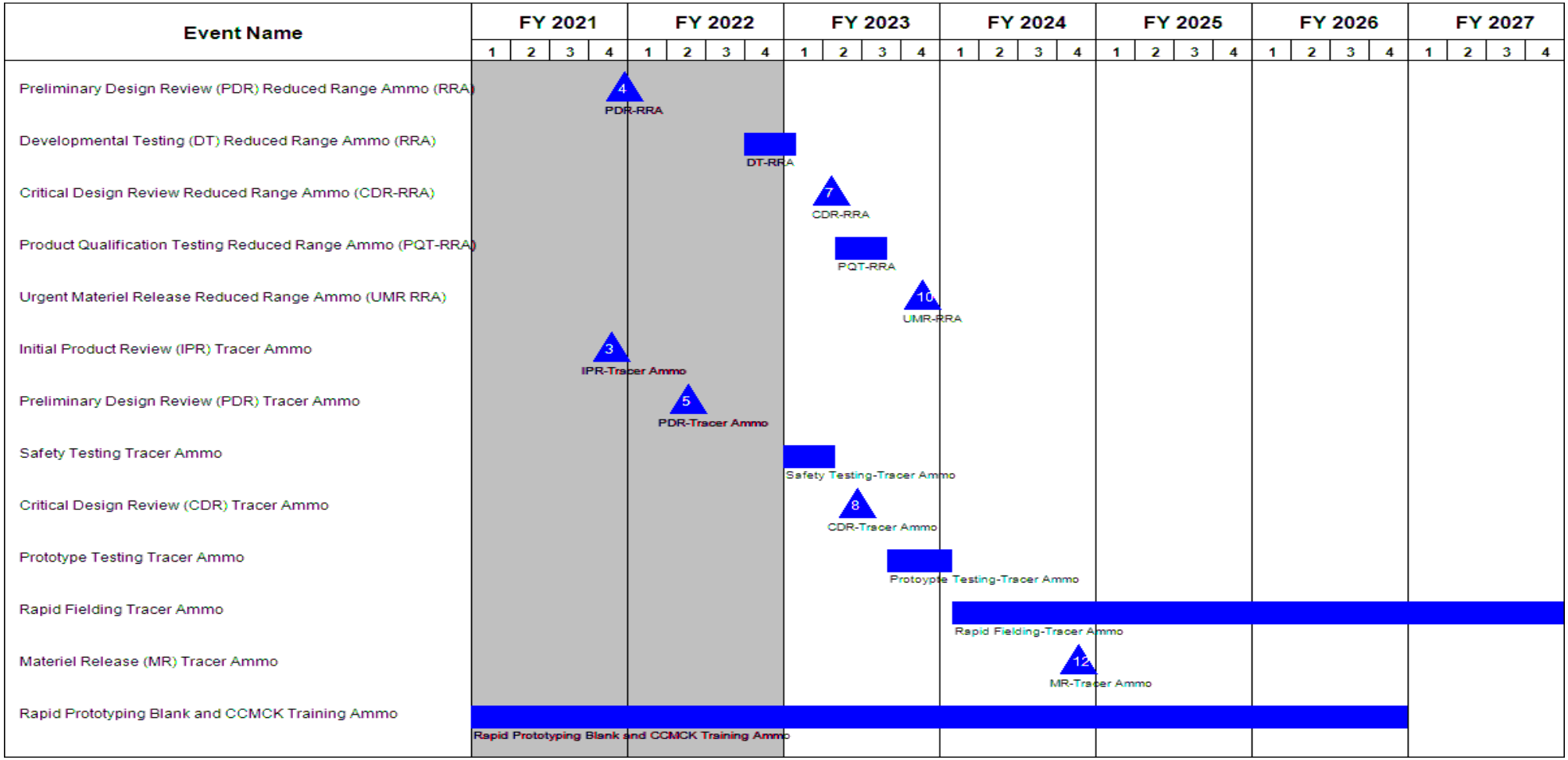

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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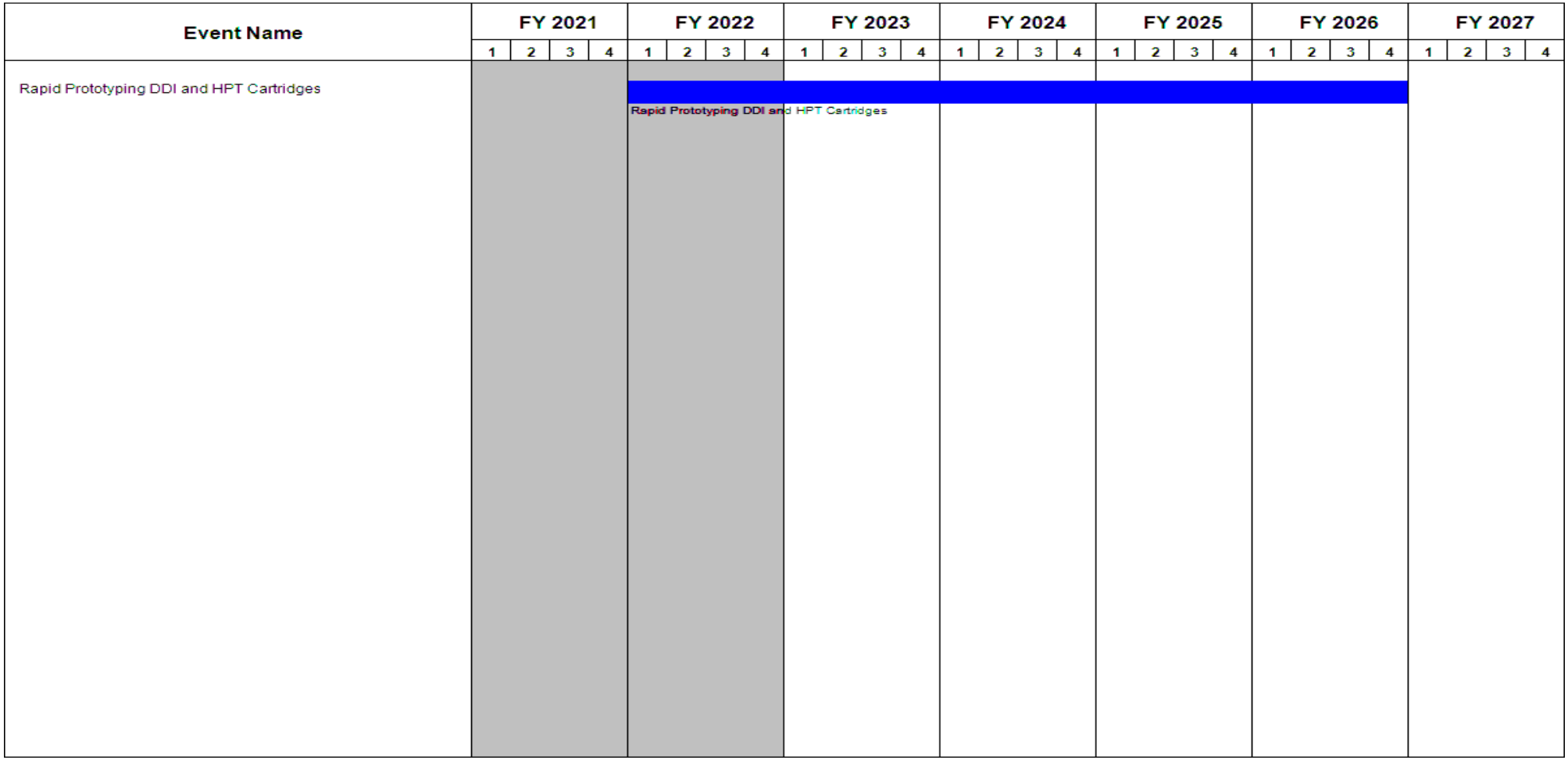

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Rapid Prototyping Effort	1	2019	2	2024
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

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** FL4 / *Small Caliber Ammo for Next Gen Squad Weapons*

	Start		End	
Events	**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)

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / *Weapons and Munitions - Eng Dev*	Project (Number/Name) S36 / *Precision Guidance Kit*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
S36: *Precision Guidance Kit*	-	32.147	35.494	29.838	-	29.838	5.131	3.413	3.414	3.448	0.000	112.885
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) 2023 funding supports the build and safety and development testing of the LR-PGK Urgent Materiel Release (UMR) configuration as well as development of the Full Materiel Release (FMR) design configuration.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Long Range-Precision Guidance Kit (LR-PGK) Development	32.147	34.197	29.838
Description: 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). ***FY 2022 Plans:*** EMD activities including prototype testing, tactical guided flight testing in the threat environment, and fabrication of developmental test hardware. ***FY 2023 Plans:*** Safety and development testing of the LR-PGK Urgent Materiel Release (UMR) configuration as well as development of the Full Materiel Release (FMR) design configuration. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding decreases with GPS System Maturation being funded under System development contract.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	-	1.297	-
FY 2022 Plans: FY 2022 funding to be assess per SBIR Title 15 USC ?638(f)(1) and STTR Title 15 USC ?638(f)(1)(A). ***FY 2022 to FY 2023 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** S36 / *Precision Guidance Kit*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 SBIR/STTR to be assessed within year of execution.			
Accomplishments/Planned Programs Subtotals	32.147	35.494	29.838

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• E99251: *LONG-RANGE PRECISION GUIDANCE KIT (LR-PGK)*	-	24.677	37.891	-	37.891	33.793	82.653	78.707	85.427	0.000	343.148

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) Operational Assessment (OA) as well as future Urgent Material Release (UMR) and Full Material Release (FMR) quantities.

Program Element (PE) 0604802A, Project EU6, 155mm Rocket Assisted Projectile Extended Range FY 2021 Congressional Add knowledge points are being utilized to support long range precision fuze development efforts, and provide a risk mitigation alternative to support the ERCA System of Systems OA.

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 Fiscal Year (FY) 2017, followed by a DOTC Risk Reduction concept maturation phase in FY 2018 through FY 2019. This developmental program has the objective to develop and safety qualify an initial XM1172 configuration to support the FY 2024 Extended Range Cannon Artillery (ERCA) Operational Assessment and a follow-on Urgent Material Release (UMR). This overlaps with the development of the M1171/M1172 configurations for Full Material Release (FMR). The FMR qualification effort will take place in FY 2025 to support Milestone C, in FY 2026. The program will transition to a Federal Acquisition Regulation (FAR) based production contract to support the XM1172 UMR deliveries in FY 2024 and FY 2025. Subsequent to Milestone C the program will transition to a FAR based contract for Low Rate Initial Production (LRIP) in FY 2026 and Full Rate Production (FRP) in FY 2027 to support the delivery of the M1171/M1172 FMR configuration quantities.

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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Office	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	14.017	0.026	Oct 2020	0.075	Oct 2021	0.100	Oct 2022	-		0.100	0.000	14.218	14.067
Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR)	TBD	Various : N/A	-	-		1.297	Mar 2022	-		-		-	0.000	1.297	-
		Subtotal	14.017	0.026		1.372		0.100		-		0.100	0.000	15.515	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LR-PGK Engineering and Manufacturing Development (EMD)	MIPR	Other Transaction Agreement (OTA) : TBS	22.329	18.264	Feb 2021	27.003	Nov 2021	23.058	Nov 2022	-		23.058	0.000	90.654	33.046
LR-PGK GPS System Maturation	MIPR	DOD Ordnance Consortium (DOTC) / L3-IEC : Various	17.412	6.342	Dec 2020	2.794	Dec 2021	-		-		-	0.000	26.548	10.551
LR-PGK Software Engineering	Reqn	Leidos, Inc. : Reston, VA	-	0.699	Sep 2021	0.700	Aug 2022	0.705	Aug 2023	-		0.705	0.000	2.104	-
Developmental Hardware	Reqn	American Ordnance, LLC : Middletown, IA	-	0.020	Sep 2021	0.095	Apr 2022	0.250	Mar 2023	-		0.250	0.000	0.365	-
		Subtotal	39.741	25.325		30.592		24.013		-		24.013	0.000	119.671	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	41.557	5.643	Dec 2020	3.030	Oct 2021	3.295	Oct 2022	-		3.295	0.000	53.525	41.412
		Subtotal	41.557	5.643		3.030		3.295		-		3.295	0.000	53.525	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Development Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	10.442	1.153	Jul 2021	0.500	May 2022	2.430	Nov 2022	-		2.430	0.000	14.525	10.442
		Subtotal	10.442	1.153		0.500		2.430		-		2.430	0.000	14.525	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	105.757	32.147		35.494		29.838		-		29.838	0.000	203.236	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)

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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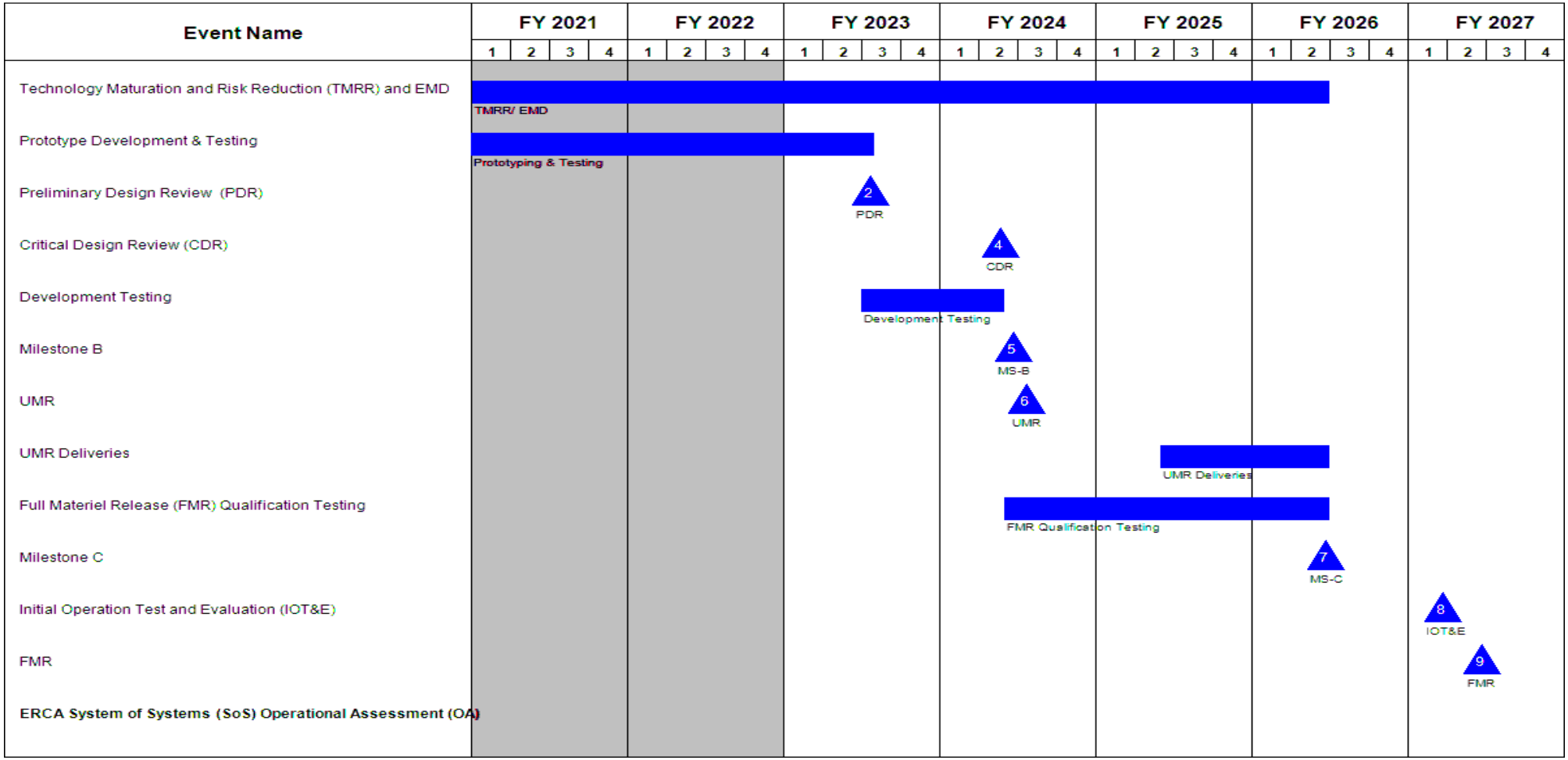

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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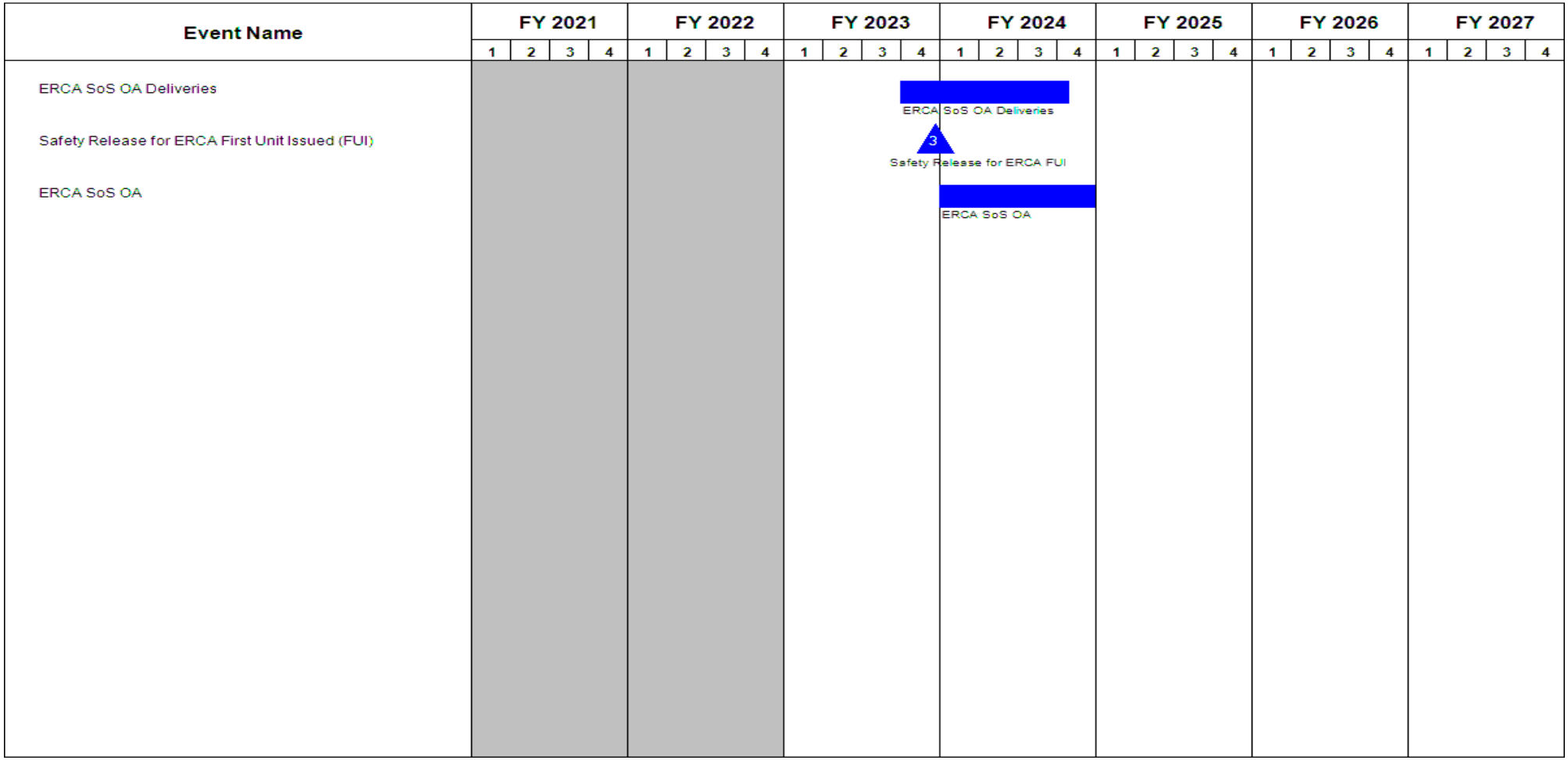

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604802A / *Weapons and Munitions - Eng Dev*	**Project (Number/Name)** S36 / *Precision Guidance Kit*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Technology Maturation and Risk Reduction (TMRR) and EMD	1	2019	2	2026
Prototype Development & Testing	2	2020	3	2023
Preliminary Design Review (PDR)	3	2023	3	2023
Critical Design Review (CDR)	2	2024	2	2024
Development Testing	3	2023	2	2024
Milestone B	2	2024	2	2024
UMR	3	2024	3	2024
UMR Deliveries	2	2025	2	2026
Full Materiel Release (FMR) Qualification Testing	2	2024	2	2026
Milestone C	2	2026	2	2026
Initial Operation Test and Evaluation (IOT&E)	1	2027	1	2027
FMR	2	2027	2	2027
ERCA System of Systems (SoS) Operational Assessment (OA)	2	2022	2	2022
ERCA SoS OA Deliveries	4	2023	4	2024
Safety Release for ERCA First Unit Issued (FUI)	4	2023	4	2023
ERCA SoS OA	1	2024	4	2024

Note

Engineering and Manufacturing Development (EMD)

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604804A *I Logistics and Engineer Equipment - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	53.676	54.642	41.669	-	41.669	26.218	21.903	12.893	13.018	0.000	224.019
194: *Engine Driven Gen Ed*	-	4.726	16.317	15.023	-	15.023	13.077	12.393	7.304	7.374	0.000	76.214
EJ9: *Maneuver Support Vessel (MSV)*	-	9.591	4.333	2.473	-	2.473	-	-	-	-	0.000	16.397
FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*	-	8.000	-	-	-	-	-	-	-	-	0.000	8.000
H02: *Tactical Bridging - Engineering Development*	-	14.445	19.158	8.528	-	8.528	-	-	-	-	0.000	42.131
L39: *Field Sustainment Support Ed*	-	3.955	1.618	1.847	-	1.847	3.285	3.866	3.128	3.159	0.000	20.858
L41: *Water And Petroleum Distribution - Ed*	-	8.707	8.548	7.921	-	7.921	6.677	2.053	-	-	0.000	33.906
L46: *Maintenance Support Equipment*	-	1.300	0.766	0.972	-	0.972	-	-	-	-	0.000	3.038
L47: *Improved Environmental Control Units Ed*	-	2.952	1.801	1.529	-	1.529	1.125	1.231	1.230	1.242	0.000	11.110
VR7: *Combat Service Support Systems*	-	-	2.101	3.376	-	3.376	2.054	2.360	1.231	1.243	0.000	12.365

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 and assault 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	53.676	59.261	0.000	-	0.000
Current President's Budget	53.676	54.642	41.669	-	41.669
Total Adjustments	0.000	-4.619	41.669	-	41.669
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-6.600			
• Congressional Rescissions	-	-			
• Congressional Adds	-	2.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	41.669	-	41.669
• FFRDC Transfer	-	-0.019	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*		
Congressional Add: *Mobile Camouflage System (MCS)*	8.000	-
Congressional Add Subtotals for Project: FG4	8.000	-
Project: H02: *Tactical Bridging - Engineering Development*		
Congressional Add: *Program increase - health usage monitoring system*	2.500	-
Congressional Add: *Program increase - national hydrography dataset*	-	2.000
Congressional Add Subtotals for Project: H02	2.500	2.000
Congressional Add Totals for all Projects	10.500	2.000

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) 194 / *Engine Driven Gen Ed*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
194: *Engine Driven Gen Ed*	-	4.726	16.317	15.023	-	15.023	13.077	12.393	7.304	7.374	0.000	76.214
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line is a key enabler for multiple Army Modernization Priorities by providing adaptable and efficient electrical power sources for network modernization, lethality, long range precision fires, and, air & missile defense. The main efforts are integrating standardized power solutions supporting specific programs and modernizations within the CPI2 command post, Soldier power battery charging, and precision fires and air & missile defense systems.

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, 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.

Power Distribution illumination Systems Electrical (PDISE) provides reliable, modular design power distribution equipment that is critical to deploying power networks. PDISE Expansion will add power distribution > 60kW. with the PPCK Improved Primary Switching Center (iPSC) and Improved Secondary Distribution Center (iSDC) to address, capability gaps identified for FPE Force Provider Expeditionary) modernization by incorporating advanced capabilities to accept either 4160 Volts Alternating Current (VAC) primary input or power from an Army Deployable Power Generation and Distribution System (DPGDS). This project supports the complete the development of the PPCK components, system integration, develop manufacturing processes, fabrication, and test and evaluate the system before proceeding into the production.

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 Functional Team (CFT) and Network CFT. It will provide battery charging power sources for Soldier borne sensors, lasers and optics.

FY 2023 funds will support prototyping and engineering, manufacturing and development efforts for the STEP Lightweight System, STEP 3kW, PDISE Expansion power distribution solution and IFCN effort.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Power Distribution Illumination Systems Electrical (PDISE) expansion	0.130	2.595	2.500

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: 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 inclusive of the Improved Primary Switching Center (iPSC) and Improved Secondary Distribution Center (iSDC) The Prime Power Connection Kit (PPCK) enables distribution of power from prime power sources which use medium voltages or higher. The system will transform medium or higher voltages down to standard 120/208 V, 3-phase power. Elements of the PPCK will enhance the existing Secondary Distribution Center (SDC) by incorporating advanced capabilities to accept either 4160 Volts Alternating Current (VAC) primary input power from a USA Deployable Power Generation and Distribution System (DPGDS) or a United States Air Force (USAF) Basic Expeditionary Airfield Resources (BEAR) power source or 13,800 VAC from contracted and commercial power sources or host nation/existing distribution systems. The PPCK includes the following: 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. Provides safe power distribution from the point of generation to the point of need - Network/C3I, Air & Missile Defense, Long Range Precision Fires, Command Post and Combat Support/Combat Service Support systems. ***FY 2022 Plans:*** FY22 PDISE Expansion Large and Prime prototype build contract award. ***FY 2023 Plans:*** FY23 funding will support PPCK contract award and prototype builds. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 decrease due to completion of PDISE Expansion Large and Prime prototype builds, and PPCK contract award			
Title: STEP ***Description:*** 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 (<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. ***FY 2022 Plans:***	4.280	12.688	11.487

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
STEP 3kW EMD contract will begin 2QFY22, and the STEP-LW 2kW OTA will finish in 3QFY22. ***FY 2023 Plans:*** Continuation of STEP 3kW EMD effort with 3 vendors ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease due to completion of STEP LW 2kW OTA and continuation of Step 3kW EMD			
Title: IFCN Effort ***Description:*** The effort will develop and integrate an advanced hybrid power solution for the AMMPS generators to initially support operation of the Integrated Fire Control Network (IFCN) Relay. Primary effort will include development and integration of a 10kW bi-directional power converter, integration of 6T format Lithium Ion (Li-Ion) batteries and development of a hybrid power architecture design that will provide IFCN a full range of AC and DC power. The bi-directional power converter will supply AC and DC power, provide AC transfer switch functions and charge Li-Ion batteries. ***FY 2022 Plans:*** The FY22 plan is to initiate design and integration of the system. ***FY 2023 Plans:*** FY23 funds will support prototype development and testing. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase in funds for prototype systems development (4 power converters, 12 battery modules per vendor).	0.316	0.439	1.036
Title: SBIR/STTR ***FY 2022 Plans:*** SBIR/STTR transfer ***FY 2022 to FY 2023 Increase/Decrease Statement:*** SBIR/STTR transfer	-	0.595	-
Accomplishments/Planned Programs Subtotals	4.726	16.317	15.023

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• G11: *Adv Elec Energy Con Ad*	9.000	4.000	0.000	-	0.000	-	-	-	-	0.000	13.000

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• MA9800: *Generators And Associated Equip*	101.239	105.892	54.400	-	54.400	80.713	87.635	96.284	96.257	Continuing	Continuing

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 FY23. STEP 3kW system will enter development at MS B in FY22.

Power Distribution Illumination Systems Electrical (PDISE) provides the linkage between the generators and the Network/C3I, Air & Missile Defense, Long Range Precision Fires, Command Post and Combat Support/Combat Service Support systems. PDISE is a family of power distribution and Illumination equipment that transmit electrical power from mobile generation equipment to the end users in a field environment. PDISE expansion program = Prime Power Connection Kit (PPCK) inclusive of the Improved Primary Switching Center (iPSC) and Improved Secondary Distribution Center (iSDC).

The acquisition strategy includes a 2-year Firm-Fixed Price (FFP) developmental contract in 1QFY23 that will develop a materiel solution to support the Force Provider Expeditionary contingency-base operations with a Prime Power Connection Kit (PPCK). The developmental contract includes the research, design, manufacturing, and delivery of first articles to support the developmental testing scheduled in 4QFY24. First article testing will be completed no later than 4QYF24 with follow-on operational assessment starting in 1QFY25.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) 194 / *Engine Driven Gen Ed*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Expansion	Various	PM E2S2 : Ft. Belvoir	1.275	-		-		1.000		-		1.000	Continuing	Continuing	Continuing
Small Power Sources	Various	PM E2S2 Ft. Belvior : Ft. Belvior	2.008	1.250		-		-		-		-	0.000	3.258	-
STEP	TBD	PM E2S2 Ft. Belvior : PM E2S2 Ft. Belvior	-	0.082		1.700		1.400		-		1.400	0.000	3.182	-
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.595		-		-		-	0.000	0.595	-
		Subtotal	3.283	1.332		2.295		2.400		-		2.400	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AMMPS HYBRID	TBD	AMMPS HYBRID : FT. BELVOIR	3.350	-		-		-		-		-	0.000	3.350	-
Small Power Sources	Various	STEP : TBD	2.719	0.425		-		-		-		-	0.000	3.144	-
STEP	TBD	PM E2S2 Ft. Belvior : PM E2S2 Ft. Belvior	-	0.400		10.086		8.790		-		8.790	0.000	19.276	-
PDISE	TBD	Prototyping and engineering, manufacturing and development efforts : TBD	-	-		2.595	Jun 2022	1.400	Dec 2022	-		1.400	0.000	3.995	-
		Subtotal	6.069	0.825		12.681		10.190		-		10.190	0.000	29.765	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Small Power Sources	TBD	STEP : TBD	0.282	0.426		-		-		-		-	0.000	0.708	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) 194 / *Engine Driven Gen Ed*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
STEP	TBD	PM E2S2 Ft. Belvior : PM E2S2 Ft. Belvior	-	0.120		0.400		0.500		-		0.500	0.000	1.020	-
PDISE Expansion	TBD	PM E2S2 : Ft. Belvoir	-	-		-		0.100		-		0.100	0.000	0.100	-
IFCN	TBD	PM E2S2 Ft. Belvoir : PM E2S2 Ft. Belvoir	-	0.316		0.439		1.036		-		1.036	0.000	1.791	-
		Subtotal	0.282	0.862		0.839		1.636		-		1.636	0.000	3.619	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PDISE Expansion	Various	PM E2S2 : Ft. Belvoir	2.418	0.130	Jan 2021	-		-		-		-	0.000	2.548	-
Small Power Sources	TBD	STEP : TBD	1.458	1.577		-		-		-		-	0.000	3.035	-
STEP	TBD	PM E2S2 Ft. Belvior : PM E2S2 Ft. Belvior	-	-		0.502		0.797		-		0.797	0.000	1.299	-
		Subtotal	3.876	1.707		0.502		0.797		-		0.797	0.000	6.882	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.510	4.726		16.317		15.023		-		15.023	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

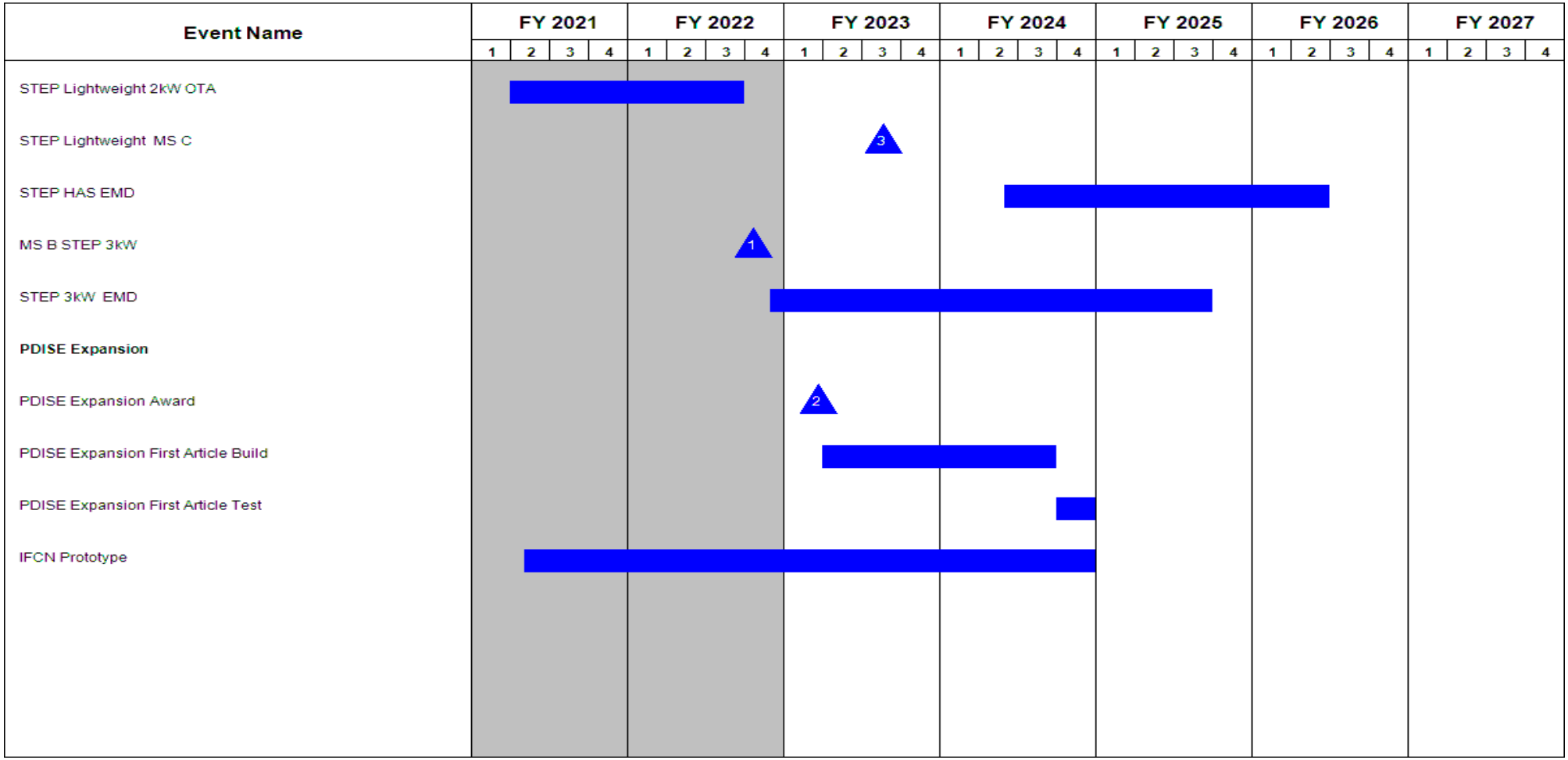

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** 194 / *Engine Driven Gen Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STEP Lightweight 2kW OTA	1	2021	3	2022
STEP Lightweight MS C	3	2023	3	2023
STEP HAS EMD	2	2024	2	2026
MS B STEP 3kW	4	2022	4	2022
STEP 3kW EMD	4	2022	3	2025
PDISE Expansion	3	2021	4	2029
PDISE Expansion Award	1	2023	1	2023
PDISE Expansion First Article Build	2	2023	3	2024
PDISE Expansion First Article Test	4	2024	4	2024
IFCN Prototype	2	2021	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) EJ9 / *Maneuver Support Vessel (MSV)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EJ9: *Maneuver Support Vessel (MSV)*	-	9.591	4.333	2.473	-	2.473	-	-	-	-	0.000	16.397
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.

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.

FY23 funds are used to complete affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Engineering and Manufacturing Development (EMD) Contract ***Description:*** 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).	6.842	-	-
Title: Government Test and Evaluation Support ***Description:*** Government test support.	0.950	-	-
Title: Government Furnished Equipment (GFE) ***Description:*** GFE for prototype vessel consists of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR).	0.200	-	-
Title: Program Management / Systems Engineering ***Description:*** 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 2022. ***FY 2022 Plans:*** Funds will cover matrix salaries for Engineers supporting SSLV program. ***FY 2023 Plans:*** Funds matrix support, travel, and general oversight efforts. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY 2023 increase is for program development.	0.456	0.500	0.605
Title: Program Management Support Contract ***Description:*** Program Management and Contract Support for MSV(L) thru FY21 and SSLV program starting in FY21.	1.143	-	-
Title: SSLV Affordability and Feasibility Studies ***Description:*** Conduct Affordability and Feasibility Studies for future watercraft modernization. ***FY 2022 Plans:***	-	3.675	1.868

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding needed to conduct feasibility studies and conduct Affordability Analysis/Cost Analysis in support of Requirements and Framing Analysis. ***FY 2023 Plans:*** Funding needed to complete feasibility studies and Affordability Analysis in support of AoA. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY 2023 decrease is due to the completion of the AoA by TRAC Fort Leavenworth.			
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.158	-
Accomplishments/Planned Programs Subtotals	9.591	4.333	2.473

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• R03050: *Maneuver Support Vessel (Light) (MSV-L)*	66.586	76.660	104.676	-	104.676	150.589	24.768	13.581	13.576	0.000	450.436

Remarks

Significant Accomplishments:
- 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.
- MSV(L) EMD final year funded.

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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

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): FY23 funds are used to complete affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.158		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		0.158		-		-		-	Continuing	Continuing	N/A

Remarks

COVID19 IMPACTS: Although the MSV(L) OEM is on schedule to deliver the prototype on schedule, maintaining production has required the implementation of strict safety protocols, production workspace social distancing and shifting of resources from other lower priority programs to the MSV(L) effort. The OEM has been able to overcome positive test results, quarantine and keep production moving.

The shipbuilding industry is largely driven by commercial shipping customers. Army Watercraft utilizes several small business and small to medium sized shipyards, which are more vulnerable to shifts in COVID safety protocols and uncertainty. We are currently experiencing an average of 25-30% absenteeism rate at the shipyards due to COVID19. In addition, we have seen a decrease in shipyard competition, an increase in sub-contractor proposals due to COVID travel restrictions and overall increase in new production proposals. To date, we have been able to mitigate the impact to the Army Watercraft Systems Transformation Strategy (AWSTS).

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Manufacturing Development (EMD)	C/FFP	Vigor Works, LLC : Clackamas, OR	70.913	6.842	Jul 2021	-		-		-		-	0.000	77.755	77.822
Government Furnished Equipment (GFE)	Reqn	Various : Various	2.317	0.200	May 2021	-		-		-		-	0.000	2.517	-
Trade Studies and Business Analysis SSLV	TBD	Various : Various	0.264	-		3.675	Nov 2021	1.868	Nov 2022	-		1.868	Continuing	Continuing	-
		Subtotal	73.494	7.042		3.675		1.868		-		1.868	Continuing	Continuing	N/A

Remarks

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) EJ9 / *Maneuver Support Vessel (MSV)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Salaries for Matrix Personnel Army Watercraft, GVSC, ILSC PSID and ACC-Wrn.	MIPR	Detroit Arsenal : Warren, MI 48397-5000	20.764	0.456	Dec 2020	0.500	Dec 2021	0.605	Dec 2022	-		0.605	0.000	22.325	-
Salaries / Travel for Program Management Support Contracts	C/CPFF	Picatinny Arsenal, New Jersey 07806-5000 : Warren, MI 48397-5000	4.681	1.143	Feb 2022	-		-		-		-	0.000	5.824	-
		Subtotal	25.445	1.599		0.500		0.605		-		0.605	0.000	28.149	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation - Government	MIPR	ATEC: APG : APG, MD	1.046	0.950	Nov 2020	-		-		-		-	0.000	1.996	-
		Subtotal	1.046	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 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	99.985	9.591		4.333		2.473		-		2.473	Continuing	Continuing	N/A

Remarks

FY23 funds are used to complete affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

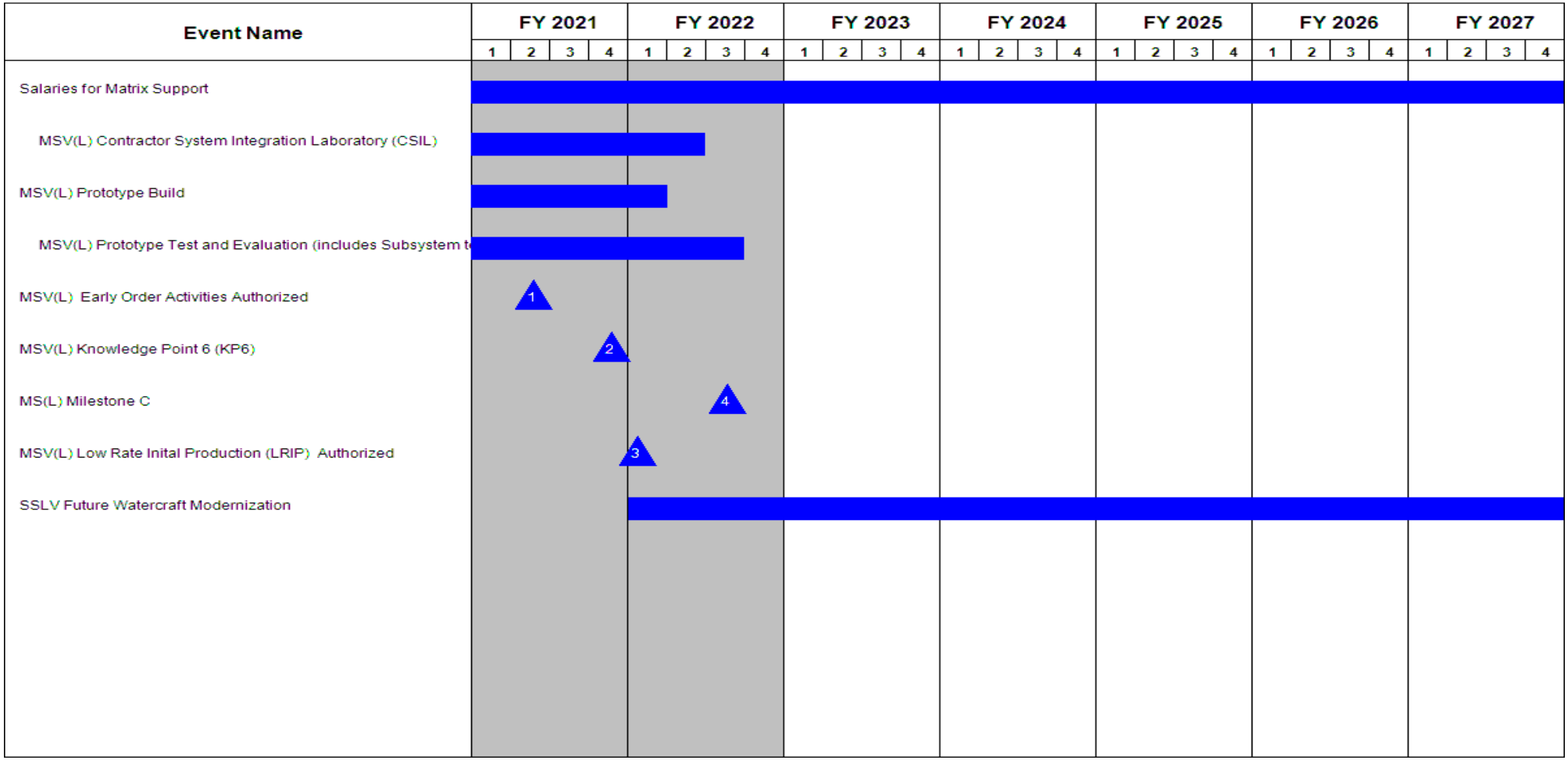

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Salaries for Matrix Support	4	2016	4	2027
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	1	2022
MSV(L) Prototype Test and Evaluation (includes Subsystem tests)	4	2019	3	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** EJ9 / *Maneuver Support Vessel (MSV)*

	Start		End	
Events	**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	3	2022	3	2022
MSV(L) Low Rate Inital Production (LRIP) Authorized	1	2022	1	2022
SSLV Future Watercraft Modernization	1	2022	4	2027

Note

FY23 funds are used to complete affordability and feasibility studies to inform the SSLV Analysis of Alternatives (AoA) and inform requirements development process.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FG4: *Ultra-Lightweight Camouflage Net System (ULCANS)*	-	8.000	-	-	-	-	-	-	-	-	0.000	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 2021	FY 2022
Congressional Add: Mobile Camouflage System (MCS)	8.000	-
FY 2021 Accomplishments: 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.		
Congressional Adds Subtotals	8.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ULCANS	Various	PMFSS : Natick, MA	3.760	-		-		-		-		-	0.000	3.760	-
Mobile Camouflage System	TBD	PMFSS : Natick, MA	0.972	1.430		-		-		-		-	0.000	2.402	-
		Subtotal	4.732	1.430		-		-		-		-	0.000	6.162	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	7.811	-		-		-		-		-	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	-
		Subtotal	20.202	4.570		-		-		-		-	0.000	24.772	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	8.468	2.000		-		-		-		-	0.000	10.468	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	33.402	8.000		-		-		-		-	0.000	41.402	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

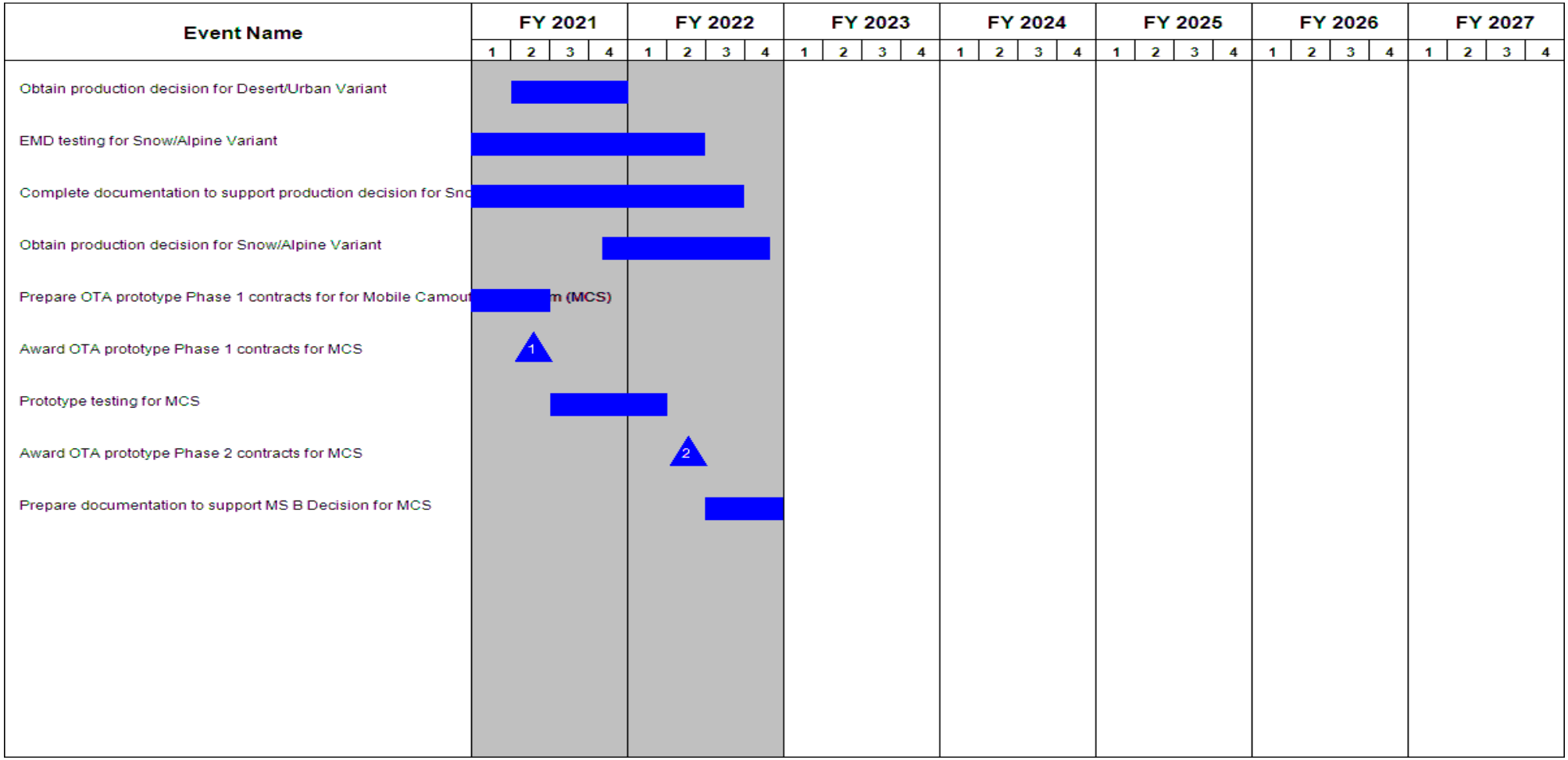

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** FG4 / *Ultra-Lightweight Camouflage Net System (ULCANS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Obtain production decision for Desert/Urban Variant	2	2021	4	2021
EMD testing for Snow/Alpine Variant	3	2020	2	2022
Complete documentation to support production decision for Snow/Alpine Variant	3	2020	3	2022
Obtain production decision for Snow/Alpine Variant	4	2021	4	2022
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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H02 / *Tactical Bridging - Engineering Development*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
H02: *Tactical Bridging - Engineering Development*	-	14.445	19.158	8.528	-	8.528	-	-	-	-	0.000	42.131
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 customer testing of the Line of Communication Bridge (LOCB), development, prototyping and testing of the Bridge Supplemental Set (BSS) and Bridge Protection Device (BPD), 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 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 (hereafter referred to as "M1A2 upgrade") in order to improve maintainability and supportability, minimize impacts of obsolescence, and establish commonality with the current Abrams Main Battle Tank (MBT) system. Funding also supports the development of new systems and modification of existing systems within the Bridging portfolio to enhance the Army's Engineering capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Line of Communication Bridge (LOCB)	9.962	11.443	1.050
Description: 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 Customer Testing (CT) of the Line of Communication Bridge (LOCB) system. ***FY 2022 Plans:*** Funding supports continuation of LOCB structural strength analysis, performance assessments, transportability testing and durability testing. Funding also supports LOCB customer testing (CT). ***FY 2023 Plans:*** Funding supports the continuation and close-out of LOCB testing. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 funding decrease due to the fact that LOCB testing will be ramping down.			
Title: Bridge Supplemental Set (BSS)	1.243	0.710	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: 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). ***FY 2022 Plans:*** Funding supports acceptance testing of the Bridge Protection Device (BPD) and supports testing/development of the BSS to meet program requirements. The BPD is a stand-alone component of the BSS and is held in APS storage until required for real-time operational employment. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 funding decrease due to the fact that FY 2022 was the last year of RDTE funding required for the BSS program. No funding requested in FY 2023.			
Title: Family of Higher Military Load Classification Bridges (FoHMLC-B) ***Description:*** 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 support the increased weights of armored combat vehicles crossing Assault Fixed, Assault Float, Tactical Fixed and Tactical Float bridging systems. ***FY 2022 Plans:*** Funding supports durability testing of the Dry Support Bridge (DSB) and Heavy Assault Scissor Bridge (HASB) up-weight prototype production. ***FY 2023 Plans:*** Funding supports development and testing of product improvements and various operational configurations for increased MLC rating of the Improved Ribbon Bridge (IRB). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 funding decrease due to reduced number of anticipated FoHMLC-B initiatives.	0.740	3.607	2.250
Title: M1A2 Chassis Upgrade of Joint Assault Bridge (JAB) and Assault Breacher Vehicle (ABV) ***Description:*** 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 Main Battle Tank system. ***FY 2022 Plans:***	-	0.365	5.228

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funding supports matrix program support and scope development of the M1A2 chassis modernization effort for JAB and ABV systems. ***FY 2023 Plans:*** Funding will support design engineering and prototype manufacturing of the M1A2 chassis modernization effort for JAB and ABV systems. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 funding increase due to ramp-up of M1A2 chassis modernization effort for JAB and ABV systems.			
Title: Bridge Erection Boat (BEB) ***Description:*** Funding supports the development and testing of a weapon mount for the Bridge Erection Boat (BEB) in order to satisfy a user requirement for the BEB to safely and effectively conduct river patrols. ***FY 2022 Plans:*** Funding supports development and testing of a weapon mount for the Bridge Erection Boat (BEB). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 funding decrease due to the fact that no funding is required in FY 2023. FY 2022 funding will complete the effort.	-	0.400	-
Title: SBIR/STTR Transfer ***Description:*** SBIR/STTR Transfer ***FY 2022 Plans:*** Funding for SBIR/STTR costs. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding for FY 2022 SBIR/STTR costs.	-	0.633	-
Accomplishments/Planned Programs Subtotals	11.945	17.158	8.528

	FY 2021	FY 2022
Congressional Add: Program increase - health usage monitoring system	2.500	-
FY 2021 Accomplishments: 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		

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

	FY 2021	FY 2022
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).		
Congressional Add: Program increase - national hydrography dataset	-	2.000
FY 2022 Plans: Funding supports the development of a national hydrography dataset.		
Congressional Adds Subtotals	2.500	2.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• G06520: *BRIDGE SUPPLEMENTAL SET*	25.994	19.867	6.774	-	6.774	4.500	-	-	-	0.000	57.135
• G82404: *LINE OF COMMUNICATION BRIDGE LOCB*	60.945	9.625	13.785	-	13.785	-	-	-	-	0.000	84.355
• GZ3001: *Joint Assault Bridge*	-	110.773	36.990	-	36.990	202.772	184.260	186.109	186.368	0.000	907.272
• G84900: *ASSAULT BREACHER VEHICLE (ABV)*	-	16.454	3.852	-	3.852	-	-	10.361	10.362	0.000	41.029
• M27200: *BRIDGE, FLOAT-RIBBON, PROPULSION*	72.074	74.182	0.000	-	0.000	42.305	30.543	-	-	0.000	219.104

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H02 / *Tactical Bridging - Engineering Development*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering and Program Management	MIPR	Various : Various	2.431	1.050	Oct 2020	1.090	Oct 2021	1.035	Oct 2022	-		1.035	Continuing	Continuing	-
SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.633	Mar 2022	-		-		-	0.000	0.633	-
		Subtotal	2.431	1.050		1.723		1.035		-		1.035	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Line of Communication Bridge - 50m Fixed Load Plan Development - Acrow	SS/FFP	Acrow Corporation of America : Parsippany, NJ	-	0.639	Dec 2021	-		-		-		-	0.000	0.639	-
Line of Communication Bridge - 50m Fixed Load Plan Development - AGL	SS/FFP	Acrow Global Limited (AGL) (formerly Mabey Bridge Limited) : Lydney, UK	-	0.883	Dec 2021	-		-		-		-	0.000	0.883	-
Line of Communication Bridge - 130m Float Load Plan Development - Acrow	SS/FFP	Acrow Corporation of America : Parsippany, NJ	-	0.852	Jan 2022	-		-		-		-	0.000	0.852	-
Line of Communication Bridge - 130m Float Load Plan Development - AGL	SS/FFP	Acrow Global Limited (AGL) (formerly Mabey Bridge Limited) : Lydney, UK	-	1.118	Jan 2022	-		-		-		-	0.000	1.118	-
Line of Communication Bridge - 130m Float Bridge PQT System - AGL	SS/FFP	Acrow Global Limited (AGL) (formerly Mabey Bridge Limited) : Lydney, UK	-	-		6.765	Jan 2022	-		-		-	0.000	6.765	-
Family of High Military Load Class Bridges - HASB ECP Development / Product Improvements	MIPR	CCDC GVSC : SANGB, MI	2.300	0.264	Dec 2021	-		-		-		-	0.000	2.564	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H02 / *Tactical Bridging - Engineering Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	-	-		1.100	Apr 2022	-		-		-	0.000	1.100	-
Program increase - health usage monitoring system	MIPR	Various : Various	-	0.650	Mar 2022	-		-		-		-	0.000	0.650	-
Bridge Supplemental Set - Design Engineering / Prototype Development	MIPR	Tobyhanna Army Depot (TYAD) : Tobyhanna, PA	2.500	0.465	Aug 2021	-		-		-		-	0.000	2.965	-
M1A2 JAB / ABV Chassis Upgrade - Design Development	MIPR	CCDC GVSC : Warren, MI	-	-		-		0.750	Oct 2022	-		0.750	3.500	4.250	Continuing
M1A2 JAB / ABV Chassis Upgrade - Prototype Manufacturing	C/CPFF	TBD : TBD	-	-		-		3.728	Jan 2023	-		3.728	20.500	24.228	Continuing
Bridge Erection Boat - Weapon Mount Development	C/TBD	TBD : TBD	-	-		0.200	Jul 2022	-		-		-	0.000	0.200	-
		Subtotal	4.800	4.871		8.065		4.478		-		4.478	24.000	46.214	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bridge Test Lab	MIPR	CCDC GVSC - Bridge Test Lab : SANGB, MI	0.875	0.168	Nov 2020	0.185	Nov 2021	0.250	Nov 2022	-		0.250	Continuing	Continuing	-
Prototype/EMD Bridge Test Asset Transportation	TBD	TAC Code : TBD	0.256	0.010	Nov 2021	0.110	Jan 2022	0.215	Jan 2023	-		0.215	Continuing	Continuing	-
Program increase - national hydrography dataset	TBD	TBD : TBD	-	-		2.000	Jul 2022	-		-		-	0.000	2.000	-
		Subtotal	1.131	0.178		2.295		0.465		-		0.465	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) H02 / *Tactical Bridging - Engineering Development*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Line of Communication Bridge - PQT Transportability Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	1.247	1.307	Feb 2021	1.200	Apr 2022	1.050	Feb 2023	-		1.050	0.000	4.804	-
Line of Communication Bridge - PQT Durability Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	1.187	1.118	Mar 2021	1.100	Apr 2022	-		-		-	0.000	3.405	-
Line of Communication Bridge - Modeling & Sim / Data Analysis	MIPR	CCDC Data Analysis Center (DAC) : Aberdeen Proving Ground, MD	-	0.260	Oct 2021	-		-		-		-	0.000	0.260	-
Line of Communication Bridge - Vendor Test Services - Acrow	SS/FFP	Acrow Corporation of America : Parsippany, NJ	-	1.417	Aug 2021	-		-		-		-	0.000	1.417	-
Line of Communication Bridge - Vendor Test Services - AGL	SS/FFP	Acrow Global Limited (AGL) (formerly Mabey Bridge Limited) : Lydney, UK	-	1.948	Aug 2021	-		-		-		-	0.000	1.948	-
Line of Communication Bridge - Customer Testing (CT)	MIPR	Operational Test Command (OTC) : Fort Hood, TX	-	-		2.000	Jul 2022	-		-		-	0.000	2.000	-
Family of High Military Load Class Bridges - DSB - Durability Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		1.900	Jun 2022	-		-		-	0.000	1.900	-
Family of High Military Load Class Bridges - IRB Test & Evaluation	MIPR	US Army Corps of Engineers - Engineering Research and Development Center (ERDC) : Vicksburg, MS	-	-		-		1.500	Oct 2022	-		1.500	0.000	1.500	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bridge Supplemental Set - BPD Test & Evaluation	MIPR	US Army Corps of Engineers - Engineering Research and Development Center (ERDC) : Vicksburg, MS	0.250	0.250	May 2021	0.675	May 2022	-		-		-	0.000	1.175	-
Bridge Supplemental Set - PQT Transportability Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	0.196	Sep 2021	-		-		-		-	0.000	0.196	-
Bridge Erection Boat - Weapon Mount Testing	MIPR	Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD	-	-		0.200	Sep 2022	-		-		-	0.000	0.200	-
Program increase - health usage monitoring system	C/FFP	TBD : TBD	-	1.850	Mar 2022	-		-		-		-	0.000	1.850	-
		Subtotal	2.684	8.346		7.075		2.550		-		2.550	0.000	20.655	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.046	14.445		19.158		8.528		-		8.528	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

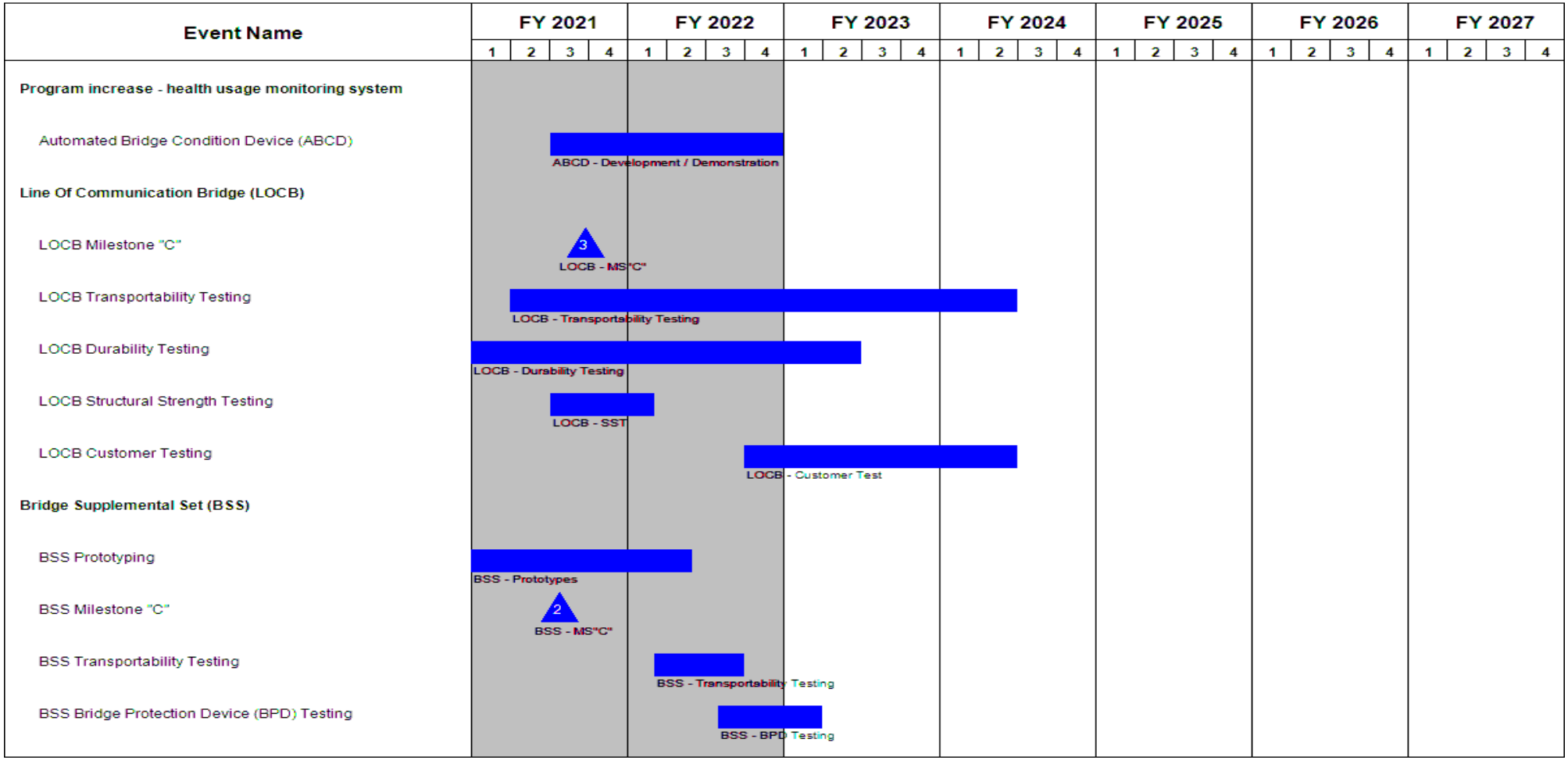

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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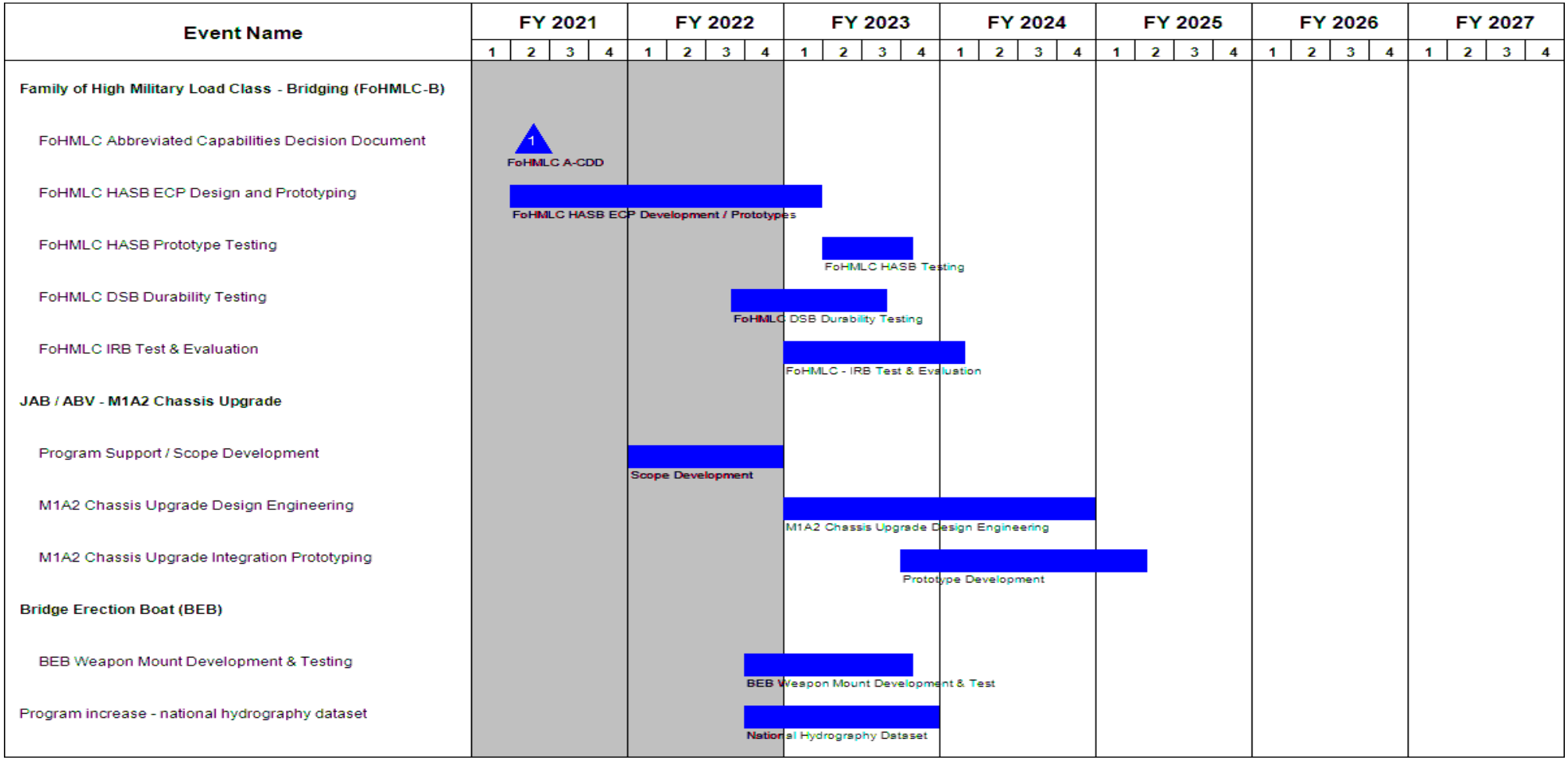

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Program increase - health usage monitoring system	3	2021	4	2022
Automated Bridge Condition Device (ABCD)	3	2021	4	2022
Line Of Communication Bridge (LOCB)	2	2012	4	2021
LOCB Milestone "C"	3	2021	3	2021
LOCB Transportability Testing	1	2020	2	2024
LOCB Durability Testing	2	2020	2	2023
LOCB Structural Strength Testing	3	2021	1	2022
LOCB Customer Testing	4	2022	2	2024
Bridge Supplemental Set (BSS)	2	2019	2	2026
BSS Prototyping	3	2020	2	2022
BSS Milestone "C"	3	2021	3	2021
BSS Transportability Testing	1	2022	3	2022
BSS Bridge Protection Device (BPD) Testing	3	2022	1	2023
Family of High Military Load Class - Bridging (FoHMLC-B)	1	2018	2	2022
FoHMLC Abbreviated Capabilities Decision Document	2	2021	2	2021
FoHMLC HASB ECP Design and Prototyping	1	2021	1	2023
FoHMLC HASB Prototype Testing	2	2023	4	2023
FoHMLC DSB Durability Testing	3	2022	3	2023
FoHMLC IRB Test & Evaluation	1	2023	1	2024
JAB / ABV - M1A2 Chassis Upgrade	1	2022	1	2026
Program Support / Scope Development	1	2022	4	2022
M1A2 Chassis Upgrade Design Engineering	1	2023	4	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** H02 / *Tactical Bridging - Engineering Development*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
M1A2 Chassis Upgrade Integration Prototyping	4	2023	2	2025
Bridge Erection Boat (BEB)	4	2022	4	2023
BEB Weapon Mount Development & Testing	4	2022	4	2023
Program increase - national hydrography dataset	4	2022	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L39 / *Field Sustainment Support Ed*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
L39: *Field Sustainment Support Ed*	-	3.955	1.618	1.847	-	1.847	3.285	3.866	3.128	3.159	0.000	20.858
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)	FY 2021	FY 2022	FY 2023
Title: Cargo Aerial Delivery	3.955	1.559	1.847
Description: Rapid Rigging and DeRigging Airdrop System (RRDAS) 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. Joint Precision Air Drop System (JPADS) provides autonomous guidance of payloads dropped from altitudes up to 25,000 feet at increments of 2,000 (2K) and 10,000 (10K) pounds. JPADS allows precise delivery of critical supplies to the Warfighter on the ground while allowing aircraft delivering payloads to fly at significantly safer altitudes. The JPADS 2K Block I Upgrade provides a GPS-denied capability, but the configuration only partially meets the GPS-denied requirement. The next configuration of JPADS must support the full GPS-denied capability, including hardware and software technologies such as night-vision, anti-jam technology, radio-based navigation, low-earth orbit satellites, and M-code.			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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. ***FY 2023 Plans:*** Complete Operational Testing and development of logistics requirements and program documentation to support Milestone C Production and Type Classification Standard decisions for RRDAS-Light (RRDAS-L). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Program increase for additional testing due to platform design change for ease of maintenance procedures.			
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** Funding for SBIR/STTR costs. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding for SBIR/STTR costs.	-	0.059	-
Accomplishments/Planned Programs Subtotals	3.955	1.618	1.847

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• MA7806: *Precision Airdrop*	4.188	2.081	0.000	-	0.000	-	-	-	-	0.000	6.269

Remarks

D. Acquisition Strategy

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM FSS : Natick, MA	6.179	0.337		0.406		0.597		-		0.597	0.000	7.519	Continuing
SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.059		-		-		-	0.000	0.059	-
		Subtotal	6.179	0.337		0.465		0.597		-		0.597	0.000	7.578	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	1.202		-		-		-		-	0.000	3.055	-
RRDAS	Various	Various : Various	1.780	0.718		0.453		0.750		-		0.750	0.000	3.701	-
		Subtotal	21.500	1.920		0.453		0.750		-		0.750	0.000	24.623	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	0.056		-		-		-		-	0.000	0.256	-
		Subtotal	0.674	0.056		-		-		-		-	0.000	0.730	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L39 / *Field Sustainment Support Ed*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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
ALVADS-L&H	Various	Yuma Proving Ground (YPG), AZ/ OTC, NC : AZ	8.288	-		-		-		-		-	0.000	8.288	Continuing
JPADS	Various	Various : Various	1.432	0.742		-		-		-		-	0.000	2.174	-
RRDAS	Various	Various : Various	0.450	0.900		0.700		0.500		-		0.500	0.000	2.550	-
		Subtotal	21.210	1.642		0.700		0.500		-		0.500	0.000	24.052	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	49.563	3.955		1.618		1.847		-		1.847	0.000	56.983	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

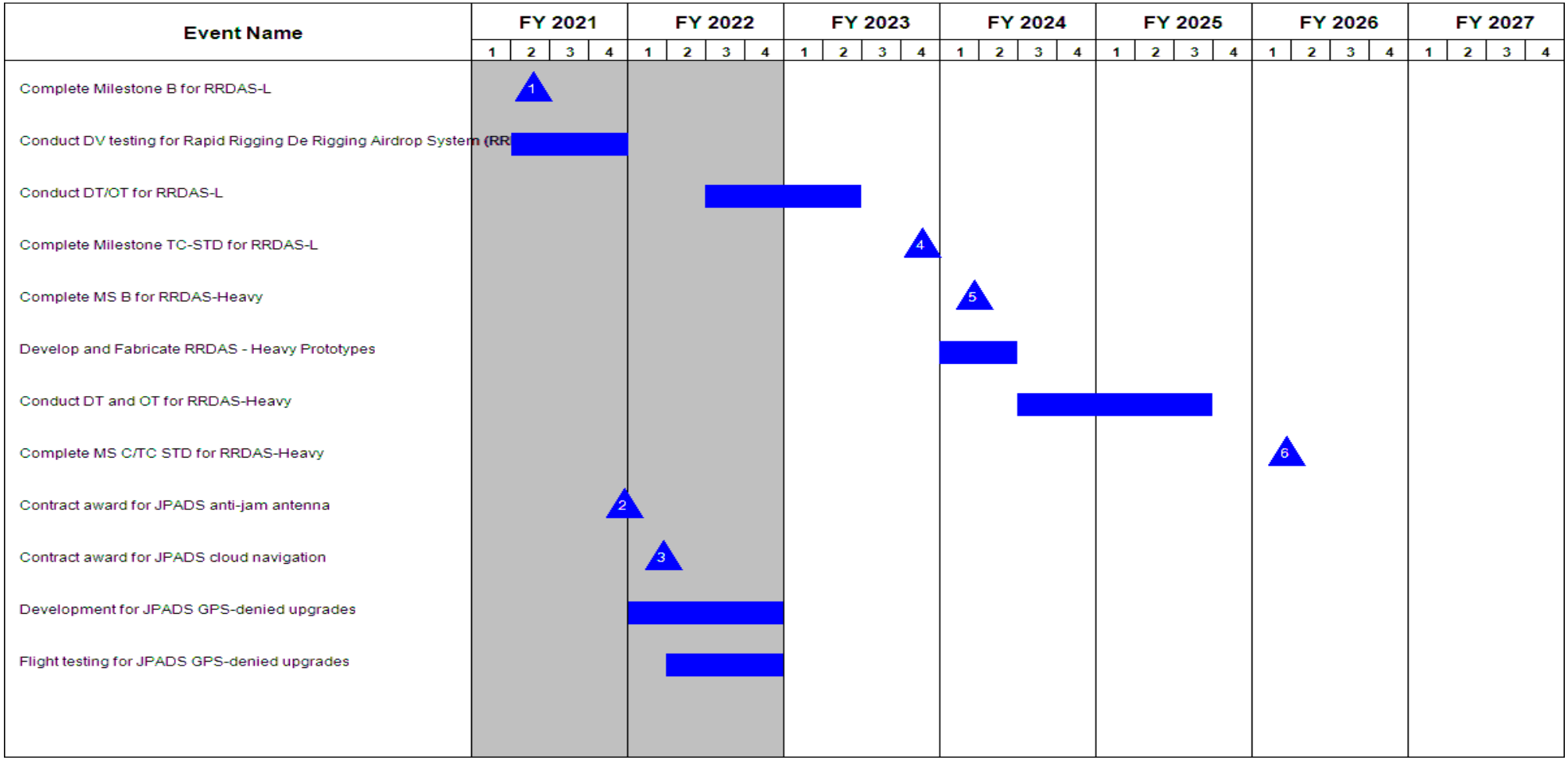

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L39 / *Field Sustainment Support Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Complete Milestone B for RRDAS-L	2	2021	2	2021
Conduct DV testing for Rapid Rigging De Rigging Airdrop System (RRDAS)-L	2	2021	4	2021
Conduct DT/OT for RRDAS-L	3	2022	2	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
Contract award for JPADS anti-jam antenna	4	2021	4	2021
Contract award for JPADS cloud navigation	1	2022	1	2022
Development for JPADS GPS-denied upgrades	1	2022	4	2022
Flight testing for JPADS GPS-denied upgrades	2	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L41 / *Water And Petroleum Distribution - Ed*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
L41: *Water And Petroleum Distribution - Ed*	-	8.707	8.548	7.921	-	7.921	6.677	2.053	-	-	0.000	33.906
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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)	FY 2021	FY 2022	FY 2023
Title: Water Bison / Bison Lite	1.790	0.894	1.845
Description: 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) 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: Water Bison - Prototype Testing at Yuma Proving Grounds, AZ ***FY 2023 Plans:*** Bison - Production Qualification Testing, User Jury / Maint Demo / LUT ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding remains stable from FY22 to FY23. FY23 RDTE will fund Production Qualification Testing for the Bison 500g variant. PM is also conducting a maintenance demonstration and user jury.			
Title: Early Entry Fluid Distribution System (E2FDS) ***Description:*** 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. ***FY 2022 Plans:*** Limited User Test (LUT), Material Release and final matrix testing support personnel costs before transitioning to Full Rate Production (FRP) ***FY 2022 to FY 2023 Increase/Decrease Statement:*** E2FDS does not require RDTE funding for FY23	0.477	0.497	-
Title: Modular Tactical Retail Refueling System (MTRRS) ***Description:*** 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 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.	1.704	-	-
Title: Petroleum Expeditionary Analysis Kit (PEAK)	0.953	0.554	1.075

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: 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. ***FY 2022 Plans:*** Complete Prototype Testing and conducting Production Qualification Testing, Customer Testing and Logistics User Test (LUT) ***FY 2023 Plans:*** PEAK requires funding to complete Production Qualification Testing, Customer Testing and Limited User Test (LUT) ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding will increase from FY22 to FY23 as PEAK completes PQT and moves into Customer Testing and Limited User Test (LUT). FY23 is the last year of RDTE funding for PEAK.			
Title: Tactical Fuel Distribution System (TFDS) ***Description:*** 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). ***FY 2022 Plans:*** Start of Prototype Run-off testing for contractor down select and Ballistics Armor study/testing. ***FY 2023 Plans:*** Completion of Prototype Run-off testing for contractor down select, Milestone C decision and award of LRIP production. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decreases from FY22 to FY23 as PM focuses on completing FY22 funded Prototype Run-off testing, requests Milestone C approval and awards LRIP production contract to support FY24 Production Qualification Testing.	0.372	3.816	0.690
Title: Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO) ***Description:*** 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	0.200	0.732	0.200

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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. ***FY 2022 Plans:*** Complete Production qualification Testing (PQT) and Operational Test. ***FY 2023 Plans:*** Completion of HIPPO Customer Testing and Limited User Test (LUT) ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decreased from FY22 to FY23 as PM completes Customer Testing and Limited User Test (LUT). Full Rate Production decision 2nd Qtr FY23. FY23 is the last year of RDTE fund for HIPPO			
Title: Bulk Fuel Distribution System (BFDS) ***Description:*** 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 will be used on improved roads.. ***FY 2022 Plans:*** Complete Production Qualification Testing, Complete Limited User Testing ***FY 2023 Plans:*** Completion of incrementally funded Production Qualification Testing started in FY22. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decreased from FY22 to FY23 as PM completed PQT. FY23 is the last year of RDTE funding for BFDS with Full Rate Production starting in FY24	1.718	0.585	1.035
Title: Water and Storage System (WSDS) ***Description:*** 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	1.493	0.274	0.821

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
the Warfighter. The 100,000 gallon WSDS is containerized and will take the place of two 40K systems in the Composite Supply Companies. ***FY 2022 Plans:*** WSDS Pump Test Asset contract award and Pump-Off testing for contractor down select. ***FY 2023 Plans:*** Completion of Production Qualification Testing, Customer Testing and Limited User Test (LUT). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decreased from FY22 to FY23 as program transitioned from buying and testing prototype pump assets in FY22 to Production Qualification Testing of LRIP assets in FY23.			
Title: Modular Fuel System (MFS) Tank Rack Module (TRM) - M107 40gpm Pump Modification Kit ***Description:*** 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. ***FY 2022 Plans:*** Modification pump kit engineering development, purchase of test assets and kit testing prior to contract award. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decreased from FY22 to FY23 as FY22 was the last year of RDTE funding for M107 40gpm Pump Modification Kit development	-	0.825	-
Title: 3k Tactical Water Purification Sys. (3k TWPS) ***FY 2022 Plans:*** Funding will be used to start program, collect market research, start product design and packaging development. ***FY 2023 Plans:***	-	0.065	2.000

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Award of 3K TWPS prototype test assets ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 is the first year of RDT&E funding for 3k TWPS. FY23 increase required for 3K TWPS prototype test assets to support Production Qualification Testing in FY23.			
Title: Chemical Biological Radiological Nuclear (CBRN) Water Hauler ***Description:*** The Chemical Biological Radiological Nuclear (CBRN) Water Hauler consists of an 800-gallon capacity tank with integral freeze protection, mounted on the MTV 5 Ton Truck. Decontamination operations require bulk non-potable water in support of the Joint Force per ATP 3-11.32 of up to 450 gallons per vehicle. Decontamination capabilities are critical in Multi-Domain Operations (MDO) because the enemy will utilize multiple layers of Anti-Access and Area Denial (A2AD) capabilities to include CBRN threats to delay and to impose high cost to obstruct strategic objectives. ***FY 2023 Plans:*** Funding will be used to start program, collect market research, start product design and packaging development. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** CBRN is a new start project for FY23.	-	-	0.255
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** SBIR/STTR Transfer ***FY 2022 to FY 2023 Increase/Decrease Statement:*** SBIR/STTR Transfer	-	0.306	-
Accomplishments/Planned Programs Subtotals	8.707	8.548	7.921

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• MA6000: *Distribution Systems, Petroleum & Water*	72.348	72.296	26.433	-	26.433	30.964	45.800	62.185	62.162	0.000	372.188
• D02001: *Semitrailers, tankers*	13.666	17.985	21.869	-	21.869	44.639	83.018	108.649	108.468	0.000	398.294
• MA4502: *INSTALLATION OF MODIFICATIONS*	6.969	5.574	6.957	-	6.957	5.948	8.510	5.807	5.805	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• MB6400: *QUALITY SURVEILLANCE EQUIPMENT*	-	0.744	2.845	-	2.845	3.049	3.002	7.800	7.797	0.000	25.237

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Matrix Spt / GVSC Engineering Spt	MIPR	Various TACOM : Warren, MI	-	3.009	Jan 2021	3.057	Jan 2022	2.266	Jan 2023	-		2.266	0.000	8.332	-
SBIR/STTR Transfer	TBD	SBBR/STTR Transfer : SBBR/ STTR Transfer	-	-		0.306	Mar 2022	-		-		-	0.000	0.306	-
		Subtotal	-	3.009		3.363		2.266		-		2.266	0.000	8.638	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
E2FDS - Tech/Ops Manuals	C/FFP	DRS SUSTAINMENT SYSTEMS, INC. : Saint Louis, MO	-	0.073	Mar 2021	-		-		-		-	0.000	0.073	-
PEAK - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Mulitple Contractors : Multiple	-	0.236	Sep 2021	-		-		-		-	0.000	0.236	-
TFDS - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Mulitple Contractors : Multiple	-	0.372	Mar 2022	1.720	Mar 2022	-		-		-	0.000	2.092	-
WSDS - Tech Data Package - ECP Update	MIPR	GVSC : Warren, MI	-	0.140	Feb 2021	-		-		-		-	0.000	0.140	-
WSDS - Pump Test Assets	C/FP	TBD - Mulitple Contractors : Multiple Contractors	-	0.594	Nov 2021	-		-		-		-	0.000	0.594	-
Bison - Contract Prototype Award (OTA)	C/FFP	TBD - OTA - Mulitple Contractors : Multiple	-	1.381	Nov 2021	-		-		-		-	0.000	1.381	-
MFS TRM - Kit Int. Design/ Eng. Pump Modification Upgrade + Test Assets	SS/FFP	ISOMETRICS : Reidsville, NC	-	-		0.228	Aug 2022	-		-		-	0.000	0.228	-
TFDS - Ballistic Study	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		0.460	May 2022	-		-		-	0.000	0.460	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3k TWPS - Prototype Test Assets	C/FP	ACC-Warren : Warren, MI	-	-		-		1.800	Mar 2023	-		1.800	0.000	1.800	-
BFDS - Prototype Design Update	C/FFP	OTA - Mulitple Contractors : Multiple	-	0.190	Apr 2021	-		-		-		-	0.000	0.190	-
		Subtotal	-	2.986		2.408		1.800		-		1.800	0.000	7.194	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
E2FDS - PQT/LUT Customer Event / Maint. Demos	MIPR	TACOM : Warren, MI	-	-		0.300	Apr 2022	-		-		-	0.000	0.300	-
HIPPO - User Jury / LUT	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		0.200	Nov 2022	-		0.200	0.000	0.200	-
Bison - User Jury / Maint Demo / LUT	MIPR	TBD : TBD	-	-		-		0.250	Aug 2023	-		0.250	0.000	0.250	-
		Subtotal	-	-		0.300		0.450		-		0.450	0.000	0.750	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MTRRS - Production Qualification Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	1.437	Feb 2021	-		-		-		-	0.000	1.437	-
MTRRS - HSL Test	MIPR	Aberdeen Test Center : Aberdeen Proving Ground, MD	-	0.021	Sep 2021	-		-		-		-	0.000	0.021	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PEAK - Protoype Dev Test - Fly Off Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	0.305	Sep 2021	0.016	Jun 2022	-		-		-	0.000	0.321	-
BFDS - APG - Prototype Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	0.220	Feb 2021	-		-		-		-	0.000	0.220	-
TFDS - Prototype Run-Off Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		0.990	Apr 2022	-		-		-	0.000	0.990	-
WSDS - Pump Off Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	0.529	Jan 2022	-		-		-		-	0.000	0.529	-
HIPPO - PQT / FAT / HSL / Transportability Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	0.200	Aug 2021	0.401	May 2022	-		-		-	0.000	0.601	-
Bison - KRC - Prototype Testing	C/FFP	Keweenaw Research Center : Calumet, MI	-	-		0.570	Mar 2022	-		-		-	0.000	0.570	-
MFS TRM - Mod Kit Prototype Testing	MIPR	Army Test Center : Yuma, AZ	-	-		0.500	Nov 2022	-		-		-	0.000	0.500	-
BFDS - Production Qualification Test	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		0.755		-		0.755	0.000	0.755	-
PEAK - Production Qualification Testing / Cust. Test (LUT)	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		0.575	Nov 2022	-		0.575	0.000	0.575	-
WSDS - Production Qualification Testing / Cust. Test (LUT)	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		0.675	Dec 2022	-		0.675	0.000	0.675	-
Bison - Production Qualification Testing	MIPR	Aberdeen Proving Ground : Aberdeen Proving Ground, MD	-	-		-		1.400	Jun 2023	-		1.400	0.000	1.400	-
		Subtotal	-	2.712		2.477		3.405		-		3.405	0.000	8.594	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L41 / *Water And Petroleum Distribution - Ed*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.707		8.548		7.921		-		7.921	0.000	25.176	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

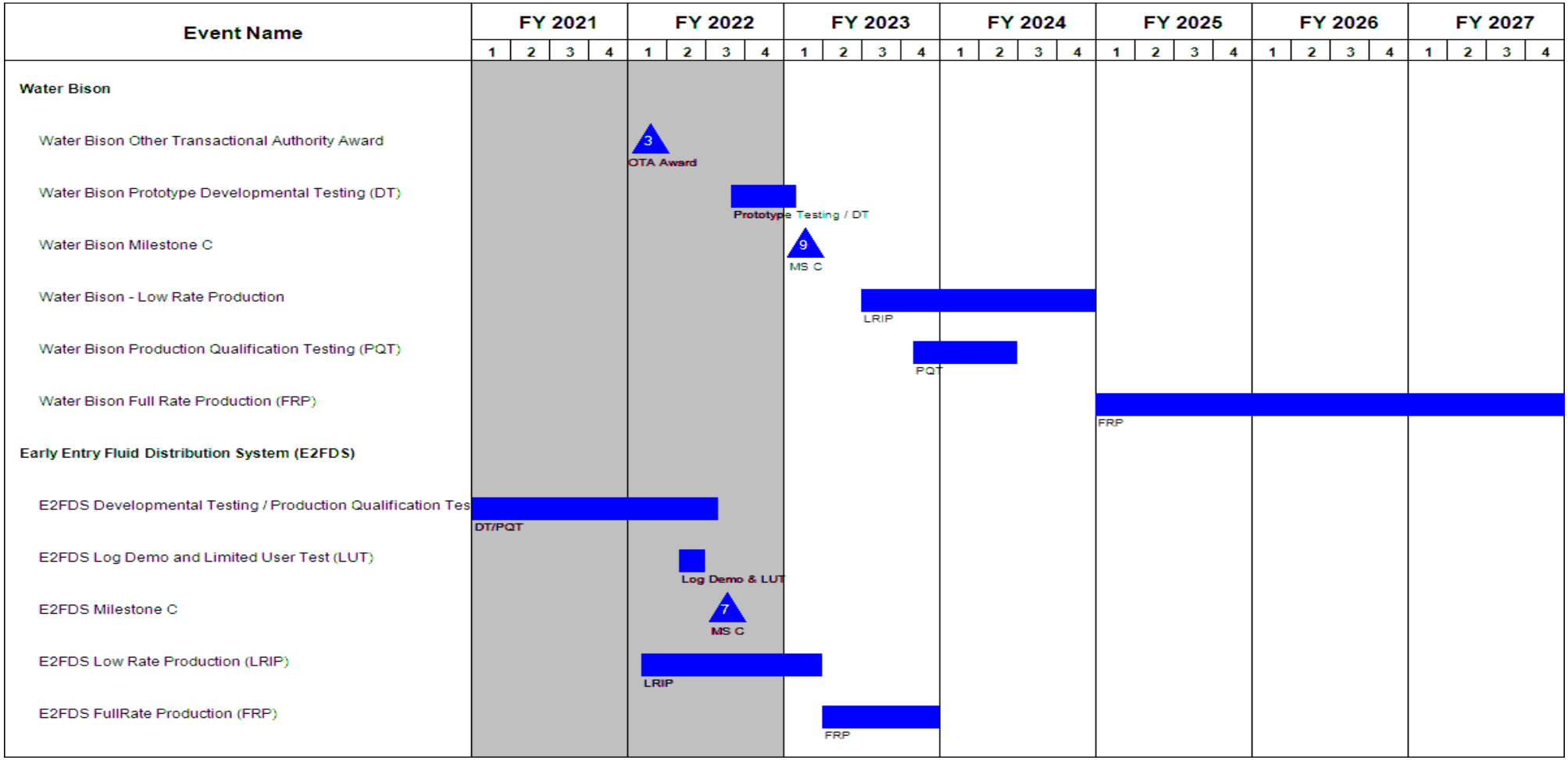

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

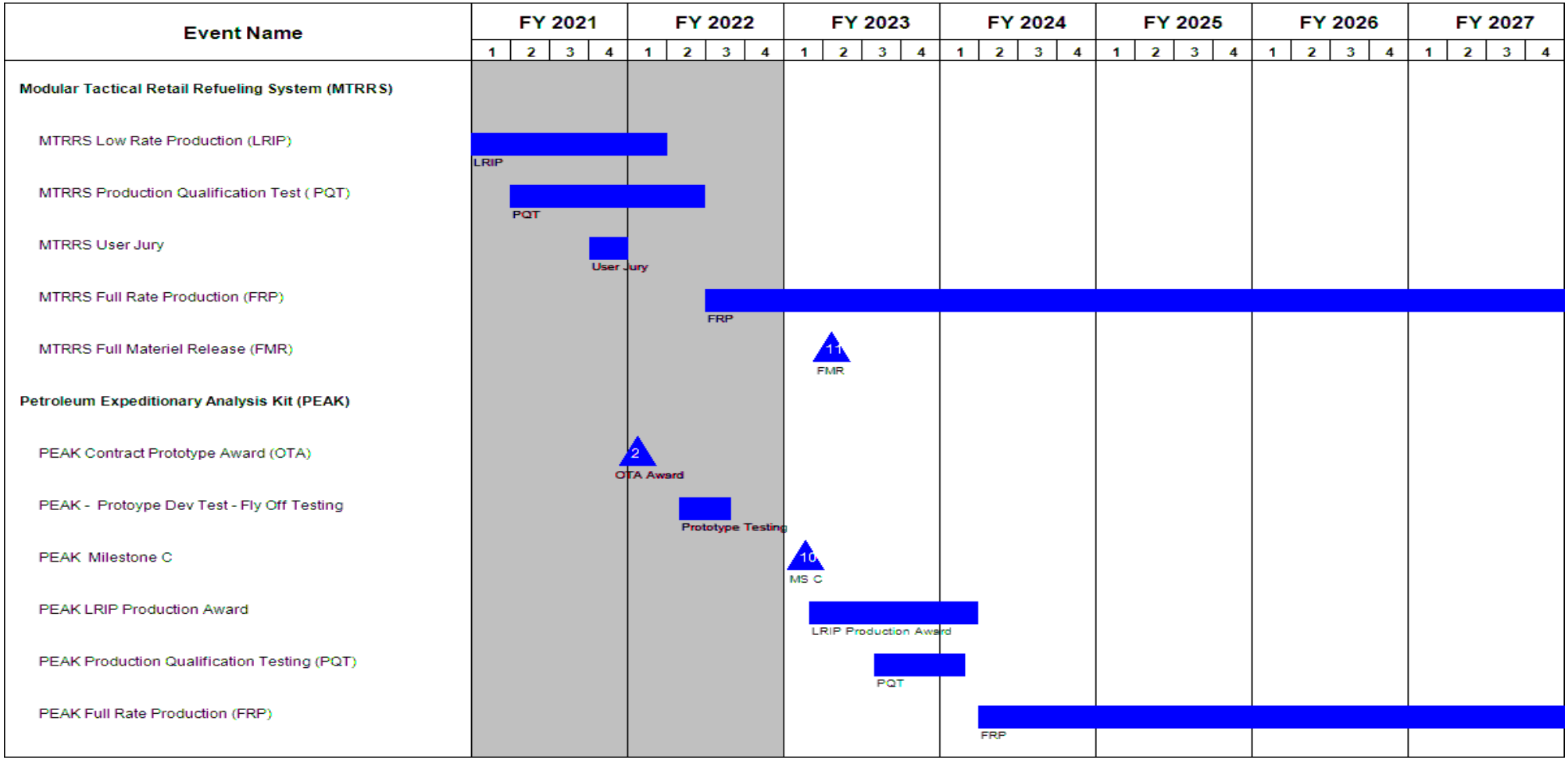

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

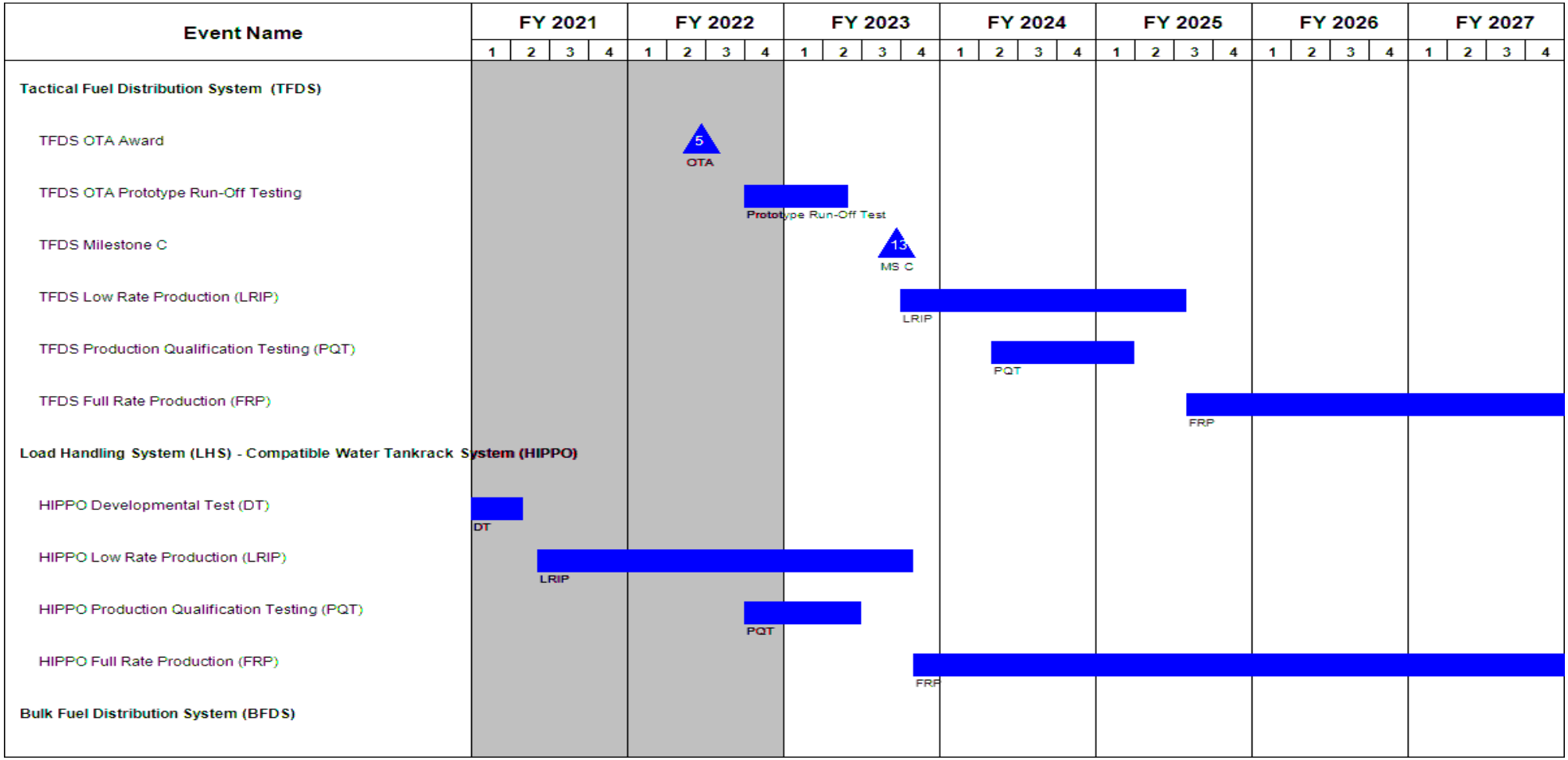

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

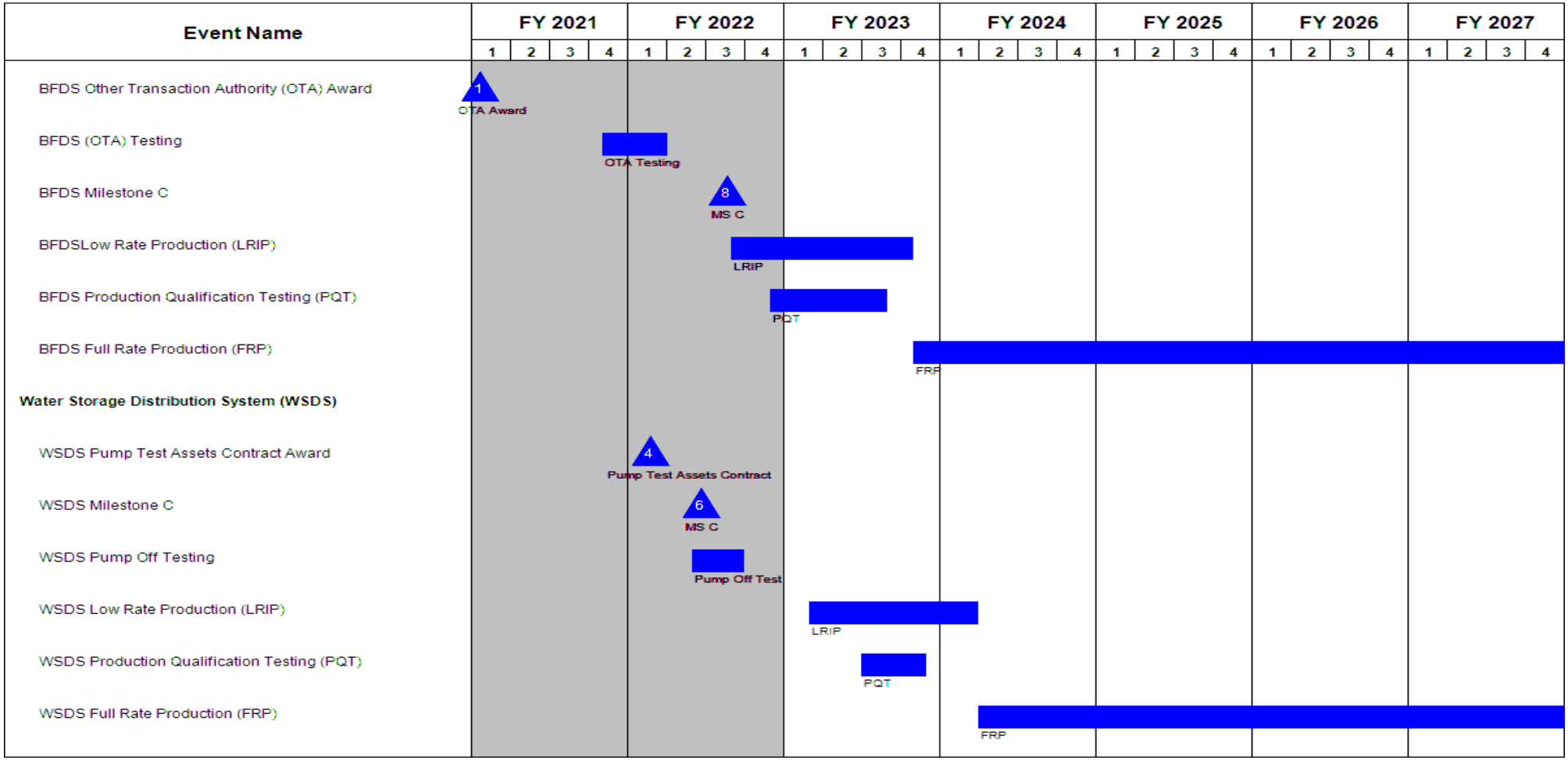

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

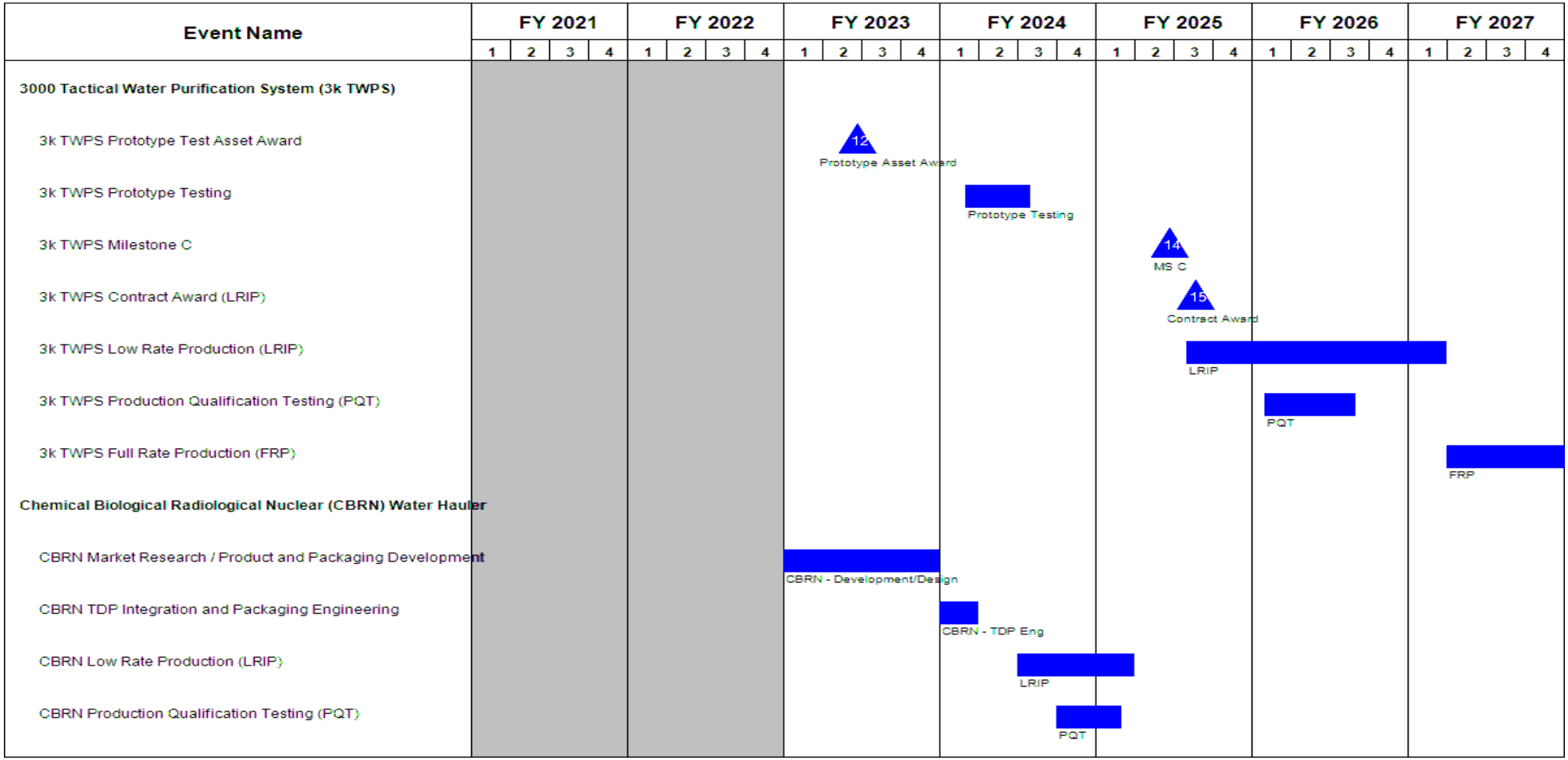

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

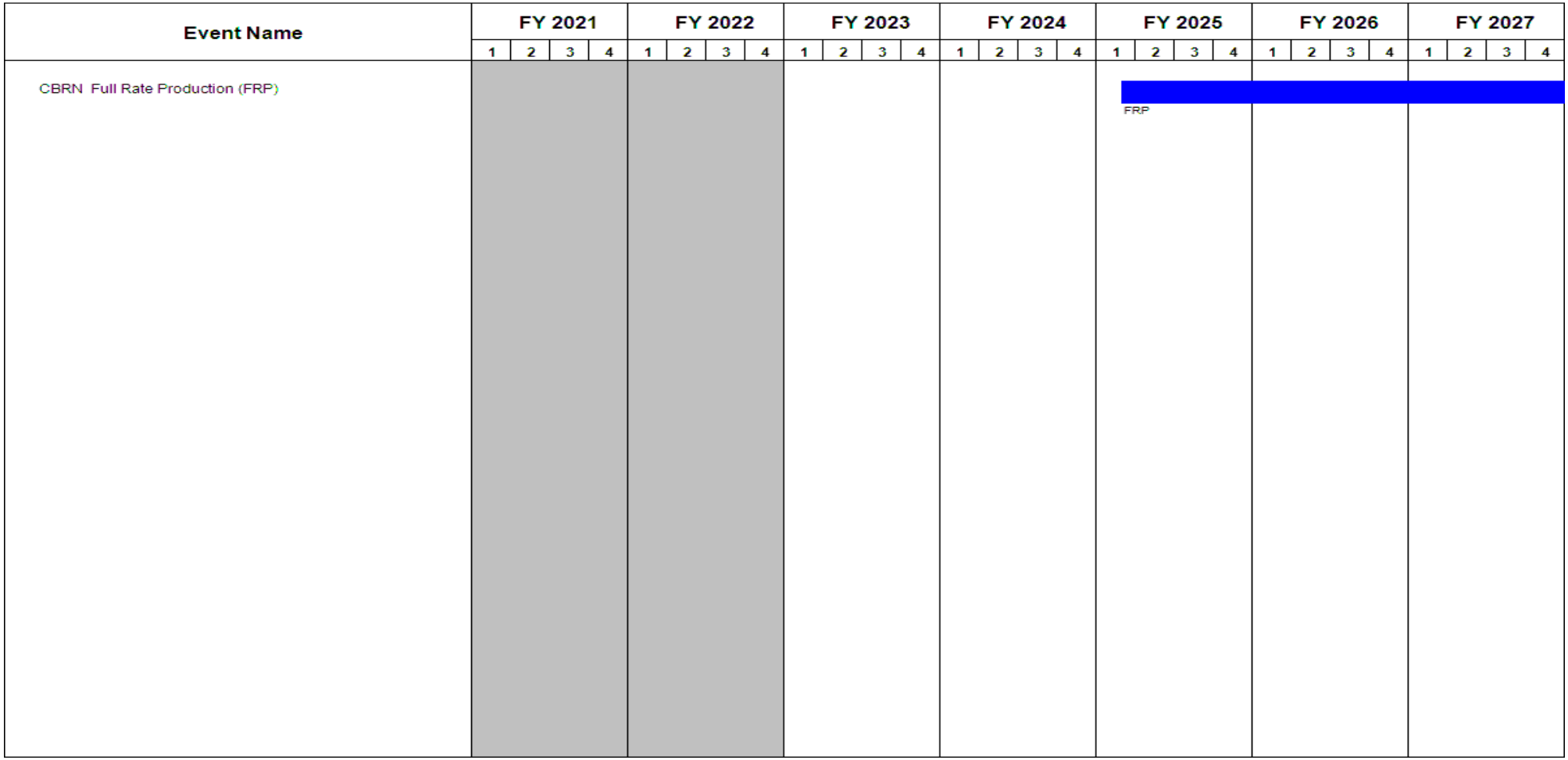

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Water Bison	1	2022	4	2025
Water Bison Other Transactional Authority Award	1	2022	1	2022
Water Bison Prototype Developmental Testing (DT)	3	2022	1	2023
Water Bison Milestone C	1	2023	1	2023
Water Bison - Low Rate Production	3	2023	4	2024
Water Bison Production Qualification Testing (PQT)	4	2023	2	2024
Water Bison Full Rate Production (FRP)	1	2025	4	2031
Early Entry Fluid Distribution System (E2FDS)	1	2018	4	2023
E2FDS Developmental Testing / Production Qualification Testing (DT/PQT)	1	2021	3	2022
E2FDS Log Demo and Limited User Test (LUT)	2	2022	2	2022
E2FDS Milestone C	3	2022	3	2022
E2FDS Low Rate Production (LRIP)	1	2022	1	2023
E2FDS FullRate Production (FRP)	2	2023	4	2023
Modular Tactical Retail Refueling System (MTRRS)	1	2017	4	2022
MTRRS Low Rate Production (LRIP)	3	2020	1	2022
MTRRS Production Qualification Test (PQT)	1	2021	2	2022
MTRRS User Jury	4	2021	4	2021
MTRRS Full Rate Production (FRP)	3	2022	1	2028
MTRRS Full Materiel Release (FMR)	2	2023	2	2023
Petroleum Expeditionary Analysis Kit (PEAK)	1	2021	3	2023
PEAK Contract Prototype Award (OTA)	1	2022	1	2022
PEAK - Protoype Dev Test - Fly Off Testing	2	2022	3	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
PEAK Milestone C	1	2023	1	2023
PEAK LRIP Production Award	1	2023	1	2024
PEAK Production Qualification Testing (PQT)	3	2023	1	2024
PEAK Full Rate Production (FRP)	2	2024	2	2029
Tactical Fuel Distribution System (TFDS)	1	2020	1	2025
TFDS OTA Award	2	2022	2	2022
TFDS OTA Prototype Run-Off Testing	4	2022	2	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	2035
Load Handling System (LHS) - Compatible Water Tankrack System (HIPPO)	3	2020	4	2025
HIPPO Developmental Test (DT)	4	2020	1	2021
HIPPO Low Rate Production (LRIP)	2	2021	4	2023
HIPPO Production Qualification Testing (PQT)	4	2022	2	2023
HIPPO Full Rate Production (FRP)	4	2023	4	2031
Bulk Fuel Distribution System (BFDS)	1	2020	2	2028
BFDS Other Transaction Authority (OTA) Award	1	2021	1	2021
BFDS (OTA) Testing	4	2021	1	2022
BFDS Milestone C	3	2022	3	2022
BFDSLow Rate Production (LRIP)	3	2022	4	2023
BFDS Production Qualification Testing (PQT)	4	2022	3	2023
BFDS Full Rate Production (FRP)	4	2023	4	2029
Water Storage Distribution System (WSDS)	4	2019	3	2028
WSDS Pump Test Assets Contract Award	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L41 / *Water And Petroleum Distribution - Ed*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
WSDS Milestone C	2	2022	2	2022
WSDS Pump Off Testing	2	2022	3	2022
WSDS Low Rate Production (LRIP)	1	2023	1	2024
WSDS Production Qualification Testing (PQT)	3	2023	4	2023
WSDS Full Rate Production (FRP)	2	2024	3	2032
3000 Tactical Water Purification System (3k TWPS)	1	2023	2	2030
3k TWPS Prototype Test Asset Award	2	2023	2	2023
3k TWPS Prototype Testing	1	2024	3	2024
3k TWPS Milestone C	2	2025	2	2025
3k TWPS Contract Award (LRIP)	3	2025	3	2025
3k TWPS Low Rate Production (LRIP)	3	2025	1	2027
3k TWPS Production Qualification Testing (PQT)	1	2026	3	2026
3k TWPS Full Rate Production (FRP)	2	2027	1	2038
Chemical Biological Radiological Nuclear (CBRN) Water Hauler	1	2023	2	2031
CBRN Market Research / Product and Packaging Development	1	2023	4	2023
CBRN TDP Integration and Packaging Engineering	1	2024	1	2024
CBRN Low Rate Production (LRIP)	3	2024	1	2025
CBRN Production Qualification Testing (PQT)	4	2024	1	2025
CBRN Full Rate Production (FRP)	1	2025	2	2031

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
L46: *Maintenance Support Equipment*	-	1.300	0.766	0.972	-	0.972	-	-	-	-	0.000	3.038
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.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: MWMSS Additive Manufacturing ***Description:*** Develop Additive Manufacturing capability for Army systems, Limited User Experiment and Evaluation. ***FY 2022 Plans:*** Expeditionary Metal Additive Manufacturing options. ***FY 2023 Plans:*** Expeditionary Metal Additive Manufacturing options. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY22 to FY23 increase of $206K due to implementation on Wire Arc Additive Manufacturing (WAAM) into MWMSS Type II Configuration.	1.300	0.738	0.972
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** SBIR/STTR Transfer ***FY 2022 to FY 2023 Increase/Decrease Statement:*** SBIR/STTR Transfer	-	0.028	-
Accomplishments/Planned Programs Subtotals	1.300	0.766	0.972

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• ML5345: *Items Less Than $5.0M (Maint Eq)*	5.570	-	0.000	-	0.000	-	-	-	-	0.000	5.570
• G05301: *Mobile Maintenance Equipment Systems*	168.106	134.756	3.936	-	3.936	11.772	4.316	3.669	3.667	0.000	330.222

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	PM SKOT : Warren, MI	0.337	0.035	Sep 2022	0.057	Sep 2023	0.037	Sep 2024	-		0.037	Continuing	Continuing	-
SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.028	Apr 2022	-		-		-	0.000	0.028	-
		Subtotal	0.337	0.035		0.085		0.037		-		0.037	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-	1.098	Sep 2021	0.457	Apr 2022	0.541	Jan 2023	-		0.541	0.000	2.096	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Dev Next Generation Shop Equipment Contact Maintenance	MIPR	CCDC : Rock Island, IL	6.062	-		-		-		-		-	0.000	6.062	-
		Subtotal	12.081	1.098		0.457		0.541		-		0.541	0.000	14.177	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	0.167	Feb 2021	0.224	Dec 2021	0.194	Dec 2022	-		0.194	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	-
		Subtotal	3.372	0.167		0.224		0.194		-		0.194	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L46 / *Maintenance Support Equipment*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ARSS 2 Testing	MIPR	ATEC : Aberdeen Test Center	0.318	-		-		-		-		-	0.000	0.318	-
Testing of the Next Generation Shop, Equipment Welding	MIPR	ATEC : Aberdeen Test Center	0.315	-		-		-		-		-	0.000	0.315	-
Fire Suppression Refill System (FSRS) testing	MIPR	ATEC : Aberdeen Test Center	0.287	-		-		-		-		-	0.000	0.287	-
Next Generation Shop Equipment Contact Maintenance test	MIPR	ATEC : Aberdeen Test Center	2.131	-		-		-		-		-	0.000	2.131	-
Additive Manufacturing testing	TBD	ATEC : Aberdeen Test Center	-	-		-		0.200	Mar 2023	-		0.200	0.000	0.200	-
		Subtotal	3.051	-		-		0.200		-		0.200	0.000	3.251	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	18.841	1.300		0.766		0.972		-		0.972	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

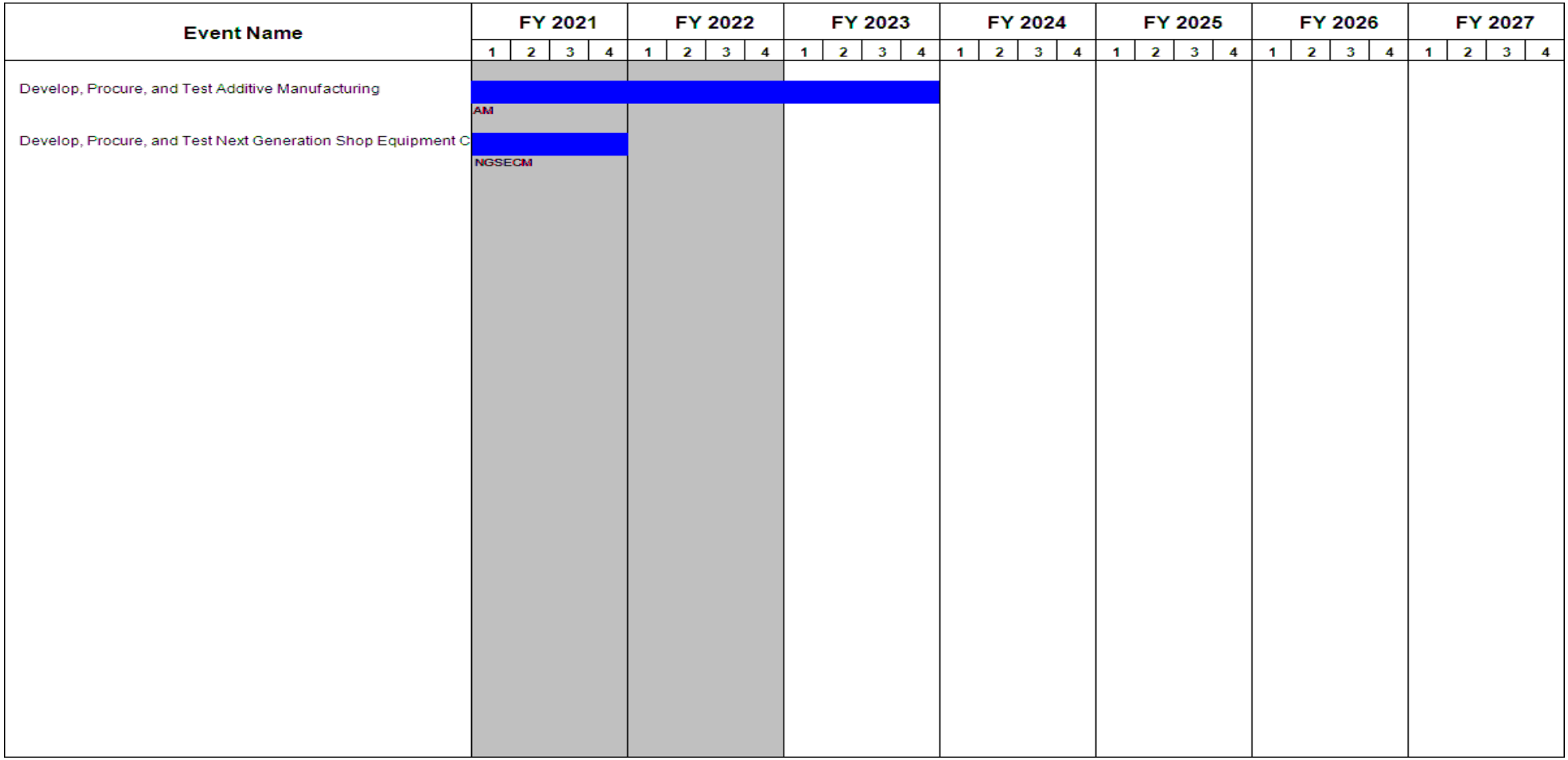

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L46 / *Maintenance Support Equipment*

Schedule Details

	Start		End	
Events	**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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L47 / *Improved Environmental Control Units Ed*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
L47: *Improved Environmental Control Units Ed*	-	2.952	1.801	1.529	-	1.529	1.125	1.231	1.230	1.242	0.000	11.110
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) (including Towable Expeditionary Shelter System (TESS) and Trailer Mounted Support System (TMSS)), the Army Standard Family of Rigid Wall Shelters (ASFRWS) 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)	FY 2021	FY 2022	FY 2023
Title: Technology Development	1.267	0.800	0.454
Description: Development and integration of Improved Environmental Control Units (IECU) in the range of 9-60K BTUH to support integrated shelter and command post systems.			
FY 2022 Plans: Develop performance enhancements for 9/18/36K IECUs to improve capacity, carryover, efficiency, and in-rush characteristics in accordance with operational requirements.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Identify and evaluate a near term drop in replacement refrigerant to provide a lower Global Warming Potential (GWP) alternative for existing and new production18K & 36K's as well as test 9K remediation developed in FY22 including near term refrigerant. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 decrease in funds reflect Technology Development effort nearing completion			
Title: Government System Test and Evaluation ***Description:*** Testing of prototype performance for multiple variants of the IECUs and soft wall shelter ECUs. ***FY 2022 Plans:*** Design and testing for potential product improvements to IECU family (Block II) and support User Engagements. ***FY 2023 Plans:*** Conduct testing to verify performance and reliability of 9/18/36K IECUs with interim drop in replacement refrigerant chemical to provide a lower Global Warming Potential alternative for existing and new production IECUs. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 increase in funds reflect contract focus moving into government test and evaluation.	0.250	0.500	0.600
Title: Other Contract and Government Agency ***Description:*** 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. ***FY 2022 Plans:*** Concept development for IECU integration and/or new variants in support of IECU Data Interchange (DI) customers. ***FY 2023 Plans:*** Provide refrigeration technical expertise in support of alternative near term refrigerant development efforts and integration and/or adaptations for IECU user programs across the Army. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Shift of technical support from external to inhouse resources.	0.235	0.301	0.125
Title: Government Program Management	1.200	0.134	0.350

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: 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. ***FY 2022 Plans:*** 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. ***FY 2023 Plans:*** Continue to provide oversight and management of engineering, logistics, contracts, and testing efforts for product improvement and next generation IECU system development efforts including 9/18/36K and 60K IECU programs. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Shift of technical support from external to inhouse resources.			
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** SBIR/STTR Transfer ***FY 2022 to FY 2023 Increase/Decrease Statement:*** SBIR/STTR Transfer	-	0.066	-
Accomplishments/Planned Programs Subtotals	2.952	1.801	1.529

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• MF9303: *IMPROVED ENVIRONMENTAL CONTROL UNITS*	8.570	6.116	7.672	-	7.672	7.712	7.500	7.504	7.502	Continuing	Continuing

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/

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L47 / *Improved Environmental Control Units Ed*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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		0.067		0.350		-		0.350	0.000	1.995	Continuing
60K IECU	Various	PM E2S2 : various	0.523	0.150		0.067		-		-		-	0.000	0.740	-
SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.066		-		-		-	0.000	0.066	-
		Subtotal	1.951	0.300		0.200		0.350		-		0.350	0.000	2.801	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
9 ,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	NSSC : Natick, MA	2.193	1.140		0.800		0.454		-		0.454	0.000	4.587	Continuing
60K IECU	MIPR	ARDEC PIF : Huntsville. AL	4.462	0.127		-		-		-		-	0.000	4.589	-
		Subtotal	6.655	1.267		0.800		0.454		-		0.454	0.000	9.176	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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	0.900		0.301		0.125		-		0.125	0.000	4.155	-
60K IECU	Various	CERDEC : Fort Belvoir, VA	4.407	0.235		-		-		-		-	0.000	4.642	-
		Subtotal	7.236	1.135		0.301		0.125		-		0.125	0.000	8.797	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) L47 / *Improved Environmental Control Units Ed*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
9,18 and 36K Improved Environmental Control Unit (IECU)	MIPR	ETL : Dallas, TX	0.528	-		0.500		0.600		-		0.600	0.000	1.628	-
60K IECU	MIPR	ATEC : APG, MD	0.912	0.250		-		-		-		-	0.000	1.162	-
		Subtotal	1.440	0.250		0.500		0.600		-		0.600	0.000	2.790	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.282	2.952		1.801		1.529		-		1.529	0.000	23.564	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

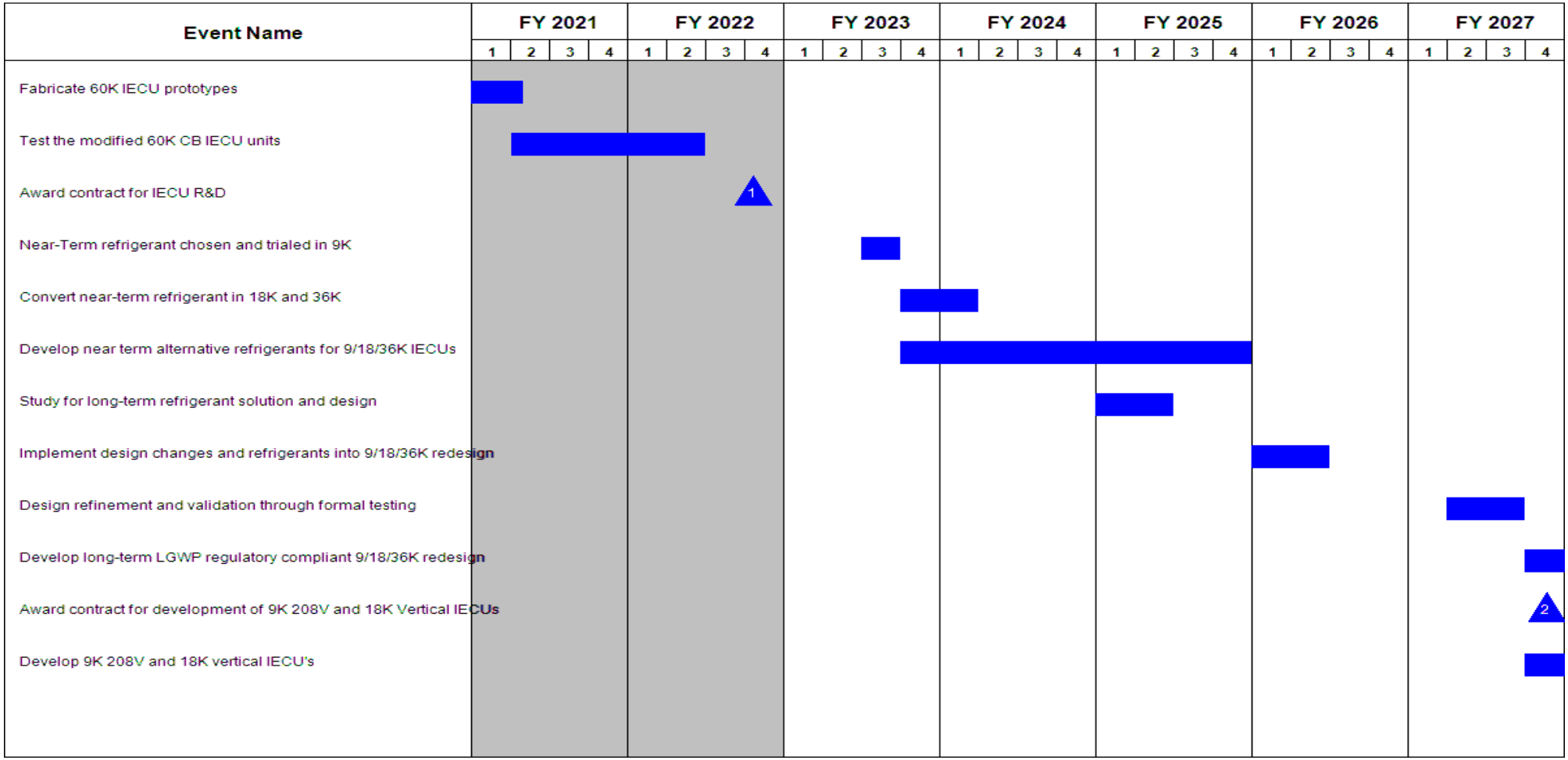

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** L47 / *Improved Environmental Control Units Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Fabricate 60K IECU prototypes	2	2020	1	2021
Test the modified 60K CB IECU units	2	2021	2	2022
Award contract for IECU R&D	4	2022	4	2022
Near-Term refrigerant chosen and trialed in 9K	3	2023	3	2023
Convert near-term refrigerant in 18K and 36K	4	2023	1	2024
Develop near term alternative refrigerants for 9/18/36K IECUs	4	2023	4	2025
Study for long-term refrigerant solution and design	1	2025	2	2025
Implement design changes and refrigerants into 9/18/36K redesign	1	2026	2	2026
Design refinement and validation through formal testing	2	2027	3	2027
Develop long-term LGWP regulatory compliant 9/18/36K redesign	4	2027	3	2028
Award contract for development of 9K 208V and 18K Vertical IECUs	4	2027	4	2027
Develop 9K 208V and 18K vertical IECU's	4	2027	4	2029

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) VR7 / *Combat Service Support Systems*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
VR7: *Combat Service Support Systems*	-	-	2.101	3.376	-	3.376	2.054	2.360	1.231	1.243	0.000	12.365
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 allow mobile Joint Service command and control, as well as medical, force projection, and maintenance platforms. This project develops critical enablers that support a number of strategic initiatives, including the Army Campaign Plan, the Army Modernization Strategy, the Army Climate Strategy, and the Army Arctic Strategy. This project 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. Specifically, shelters developed under these efforts will be better insulated and more energy efficient, thus reducing environmental control requirements, energy demand, and fuel usage. Therefore, they will reduce the Army's logistics and carbon footprint and lengthen the resupply interval in contested, support-constrained environments. Additionally, better insulated shelter systems allow for operational viability in extreme environments such as the Arctic.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Army Standard Family of Rigid Wall Shelters (ASF-RWS)	-	2.025	3.376
Description: 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 and tested standard shelter designs 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			
FY 2022 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Obtain Development Decision, award development contract and initiate design development for ASF-RWS Phase 2 - Vehicle Mounted Variant. ***FY 2023 Plans:*** Award performance specification based development contract with production options, conduct design development build and test PQT units, conduct Test Readiness Review (TRR) and initiate logistics development for ASF-RWS P1 (Expandable/Non-expandable ISO Variant). Conduct market strategy, develop performance specification, build performance specification based RFP with production options for ASF-RWS P2 (Vehicle Mounted Variant). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Program increase to support PQT build and initial logistics development			
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** SBIR/STTR Transfer ***FY 2022 to FY 2023 Increase/Decrease Statement:*** SBIR/STTR Transfer	-	0.076	-
Accomplishments/Planned Programs Subtotals	-	2.101	3.376

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	Project (Number/Name) VR7 / *Combat Service Support Systems*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Management Support	Various	PM Force Sustainment Systems : Natick, MA	2.609	-		0.225		0.876		-		0.876	0.000	3.710	-
SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.076		-		-		-	0.000	0.076	-
		Subtotal	2.609	-		0.301		0.876		-		0.876	0.000	3.786	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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		2.250		-		2.250	0.000	6.050	-
		Subtotal	2.000	-		1.800		2.250		-		2.250	0.000	6.050	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Army Standard Family of Rigid Wall Shelters (ASF-RWS)	Various	Various : Various	0.582	-		-		0.250		-		0.250	0.000	0.832	-
		Subtotal	0.582	-		-		0.250		-		0.250	0.000	0.832	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.191	-		2.101		3.376		-		3.376	0.000	10.668	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

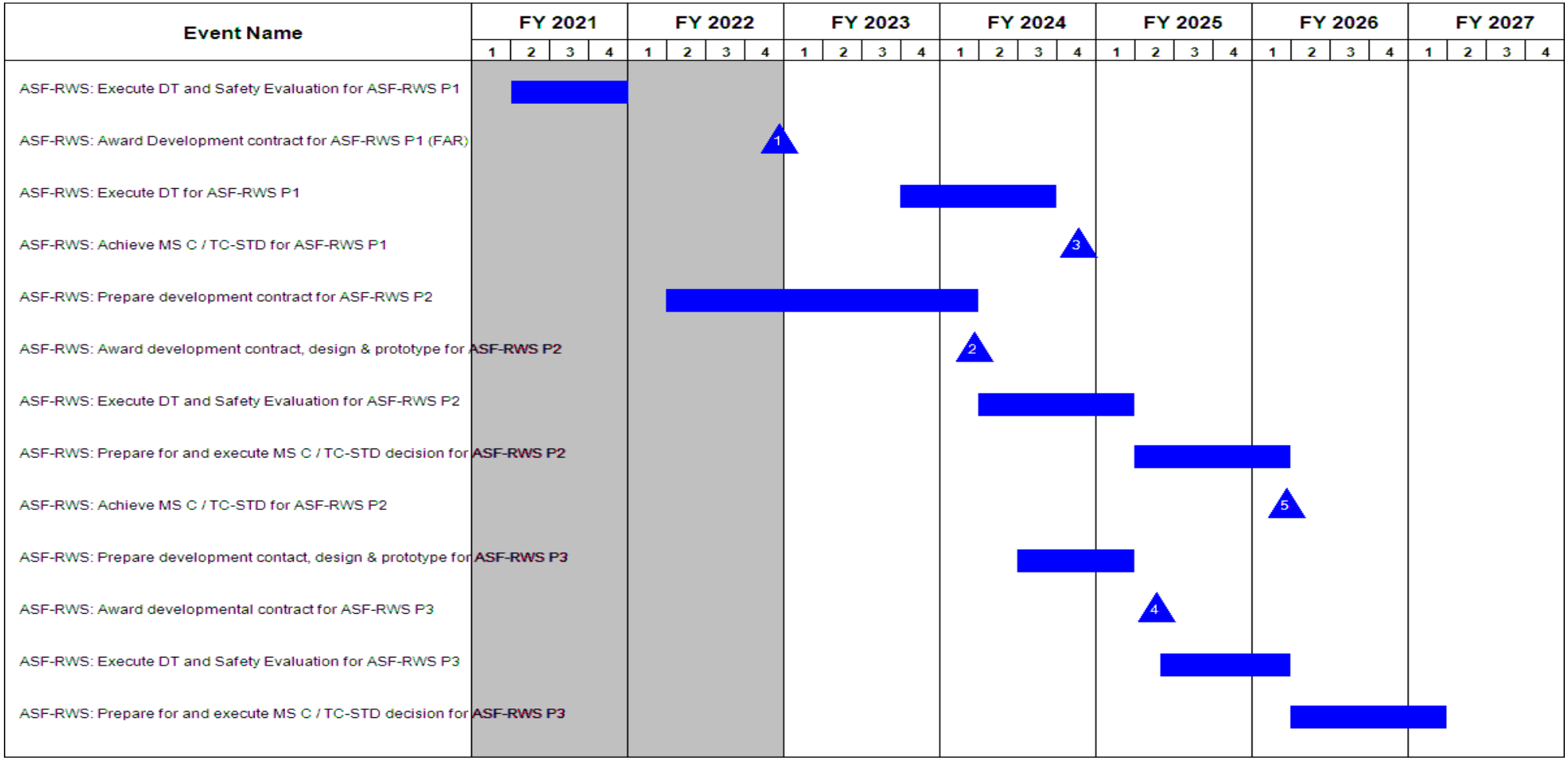

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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: Achieve MS C / TC-STD for ASF-RWS P3																									6			

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604804A / *Logistics and Engineer Equipment - Eng Dev*	**Project (Number/Name)** VR7 / *Combat Service Support Systems*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P1	2	2021	4	2021
ASF-RWS: Award Development contract for ASF-RWS P1 (FAR)	4	2022	4	2022
ASF-RWS: Execute DT for ASF-RWS P1	4	2023	3	2024
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P1	4	2024	4	2024
ASF-RWS: Prepare development contract for ASF-RWS P2	2	2022	1	2024
ASF-RWS: Award development contract, design & prototype for ASF-RWS P2	1	2024	1	2024
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P2	2	2024	1	2025
ASF-RWS: Prepare for and execute MS C / TC-STD decision for ASF-RWS P2	2	2025	1	2026
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P2	1	2026	1	2026
ASF-RWS: Prepare development contact, design & prototype for ASF-RWS P3	3	2024	1	2025
ASF-RWS: Award developmental contract for ASF-RWS P3	2	2025	2	2025
ASF-RWS: Execute DT and Safety Evaluation for ASF-RWS P3	2	2025	1	2026
ASF-RWS: Prepare for and execute MS C / TC-STD decision for ASF-RWS P3	2	2026	1	2027
ASF-RWS: Achieve MS C / TC-STD for ASF-RWS P3	1	2027	1	2027

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604805A *I Command, Control, Communications Systems - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	10.674	20.107	40.038	-	40.038	34.936	34.573	34.559	34.883	0.000	209.770
593: *Joint Battle Command - Platform (JBC-P)*	-	10.674	20.107	40.038	-	40.038	34.936	34.573	34.559	34.883	0.000	209.770

Note

Beginning with FY 2023, the Army combined the Mounted Computing Environment (MCE) (0604818/EJ5) RDT&E funding line with the JBC- P RDT&E funding line (PE 0604805A/Proj 593). As JBC-P moves towards Full Operational Capability (FOC), the JBC-P RDT&E funding requirement, starting in FY 2023, supports the developments of the Mounted Computing Environment (MCE) software (Mounted Mission Command - Software (MMC-S)) and Blue Force Tracking 3 (BFT3) (Mounted Mission Command-Transport (MMC-T)) to modernize the JBC-P capability.

A. Mission Description and Budget Item Justification

This Program Element (PE) is directly aligned to the Army Network Modernization Strategy Line of Effort (LOE) 2, Common Operating Environment and supports the Network-Cross Functional Team capability set approach to achieve the network modernization strategy through a variety of cross-cutting capabilities (CCC). Specifically, Joint Battle Command - Platform (JBC-P)/Mounted Mission Command (MMC) Family of Systems (FoS) supports the N-CFT (LOE) 2 by utilizing and providing:
- 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
- Critical Interoperability features that bridge the communications gap between the Command Post Computing Environment (CPCE) and Mobile/ Handheld Computing Environment (M/HH CE) (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 CCCs that integrate with Joint C5ISR and strike capabilities

The JBC-P and Mounted Mission Command (MMC) programs are the cornerstone of Joint Forces Command and Control (C2) Situational Awareness (SA) and communications and includes networks which enables the movement of data and provides a secure Blue Force Tracking (BFT) capability in Platforms and Command Posts. This capability provides soldiers and commanders a near real-time map-base view of the battlefield, reducing fratricide and populating the Tactical Common Operating Picture. Modernization of this capability will be accomplished via a MMC Family of Systems (FoS) program approach, which allows the most development flexibility. The MMC FoS addresses the BFT-3 effort (under the MMC Transport (MMC-T) program) and MCE effort (under the MMC Software (MMC-S) program); future programs under the FoS will address network, compute and store requirements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604805A *I Command, Control, Communications Systems - Eng Dev*

The BFT-3 (MMC-T) program continues development of the next generation BFT capabilities, including Electronic Warfare (EW) and Cyber resiliency and Modular Open Systems Approach (MOSA), developing the next generation BFT-3 (MMC-T) transceiver and encryption device. The BFT-3 (MMC-T) transceiver and encryption device will provide the Warfighter with multiple transports and increased EW and cyber resiliency.

MMC-S, which was previously funded under Mounted Computing Environment (MCE 0604818/EJ5), develops the MCE (MMC-S) capability that will converge Warfighting Function (WfF) Applications into its infrastructure, as well as developing smart routing processes which are utilized by the BFT-3 (MMC-T). MCE (MMC-S) will enhance existing JBC-P capability and prepare the software to host applications (apps) developed by external programs to provide robust WfF capabilities within the MCE.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	10.674	20.121	0.000	-	0.000
Current President's Budget	10.674	20.107	40.038	-	40.038
Total Adjustments	0.000	-0.014	40.038	-	40.038
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	40.038	-	40.038
• FFRDC Transfer	-	-0.014	-	-	-

Change Summary Explanation

Fiscal Year 2023 (FY23) funding increase reflects the fact that the FY22 President's Budget request did not include out-year funding.

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COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
593: *Joint Battle Command - Platform (JBC-P)*	-	10.674	20.107	40.038	-	40.038	34.936	34.573	34.559	34.883	0.000	209.770
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project is directly aligned to the Army Network Modernization Strategy Line of Effort (LOE) 2, Common Operating Environment and supports the Network-Cross Functional Team capability set approach to achieve the network modernization strategy through a variety of cross-cutting capabilities (CCC). Specifically, Joint Battle Command - Platform (JBC-P)/Mounted Mission Command (MMC) Family of Systems (FoS) supports the N-CFT (LOE) 2 by utilizing and providing:
- 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
- Critical Interoperability features that bridge the communications gap between the Command Post Computing Environment (CPCE) and Mobile/ Handheld Computing Environment (M/HH CE) (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 CCCs that integrate with Joint C5ISR and strike capabilities

The JBC-P and Mounted Mission Command (MMC) programs are the cornerstone of Joint Forces Command and Control (C2) Situational Awareness (SA) and communications and includes networks which enables the movement of data and provides a secure Blue Force Tracking (BFT) capability in Platforms and Command Posts. This capability provides soldiers and commanders a near real-time map-base view of the battlefield, reducing fratricide and populating the Tactical Common Operating Picture. Modernization of this capability will be accomplished via a MMC Family of Systems (FoS) program approach, which allows the most development flexibility. The MMC FoS addresses the BFT-3 effort (under the MMC Transport (MMC-T) program) and MCE effort (under the MMC Software (MMC-S) program); future programs under the FoS will address network, compute and store requirements.

The BFT-3 (MMC-T) program continues development of the next generation BFT capabilities, including Electronic Warfare (EW) and Cyber resiliency and Modular Open Systems Approach (MOSA), developing the next generation BFT-3 (MMC-T) transceiver and encryption device. The BFT-3 (MMC-T) transceiver and encryption device will provide the Warfighter with multiple transports and increased EW and cyber resiliency.

MMC-S, which was previously funded under Mounted Computing Environment (MCE 0604818/EJ5), develops the MCE (MMC-S) capability that will converge Warfighting Function (WfF) Applications into its infrastructure, as well as developing smart routing processes which are utilized by the BFT-3 (MMC-T). MCE (MMC-S)

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will enhance existing JBC-P capability and prepare the software to host applications (apps) developed by external programs to provide robust WfF capabilities within the MCE.

FY 2023 funding supports BFT-3 (MMC-T) development providing for the BFT-3 (MMC-T) transceiver and encryption device development contracts and systems engineering efforts to continue the BFT-3 (MMC-T) prototype development. BFT-3 (MMC-T) activities 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. In addition, a Critical Design Review (CDR) will be conducted for the BFT-3 transceiver and encryption device along with DEVOPS events during FY 2023.

FY 2023 funding supports MCE (MMC-S) development of MCE convergence of WfF applications and smart routing capabilities. MCE (MMC-S) activities will include development of the MCE infrastructure to host WfF apps; an Operational Test to support a Fielding Decision; and interface development to Integrated and Firing Platforms.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Software/Systems Engineering	9.475	16.503	32.159
Description: Perform Software/Systems Engineering needed to develop BFT-3 (MMC-T) capabilities, applications and services, to include, but not limited to conducting engineering studies, architecture development (network and software), system analyses, technical readiness assessments, technical interchange/exchange meetings/events, and development of related reports and other deliverables. MCE (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. ***FY 2022 Plans:*** 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. ***FY 2023 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Funds continue to support software/systems engineering and development of the BFT-3 capability (MMC-T). Specifically, it covers the BFT-3 transceiver and encryption device development contracts. Support will include; the integration of the BFT modular waveform, enabling competition by allowing third party transceiver manufacturers to access and interoperate with the existing BFT network, to include the BFT-2 SNCC and SGS, the integration of a resilient line of sight waveform on a software defined radio, the integration of the transceiver and encryption devices to each mounted platform, and an upgrade of the Waveform/Network Virtualization for the BFT network to support the new modular waveform and line of sight waveform. A CDR will also be conducted for the transceiver and encryption device development. Funds continue software development/systems engineering and incorporation of MCE (MMC-S) baseline capabilities (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. Funding will continue development of MMC-S version 3.2, focused 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 Over the Air Updates (Over The Network Keying (OTNK), Map Updates), Remote Display, Improved Route Planning / Navigation, Network Path Diversity (Smart Routing / APACE), additional third-party application integration, message standards migration, netted asset (Non A-PNT), and VICTORY migration. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Overall funding increase reflects inclusion of FY 2023 MCE (MMC-S) efforts (prior years funded in 0604818/EJ5).			
Title: Test, Evaluation and Integration	0.120	0.483	4.400
Description: Test and evaluation (T&E) efforts consist of planning and execution of required test events for MCE (MMC-S) and BFT-3 (MMC-T) to inform fielding decisions and ensure the safe delivery of capability to the Warfighter. T&E events include: Development Operations (DevOps), Developmental Tests (DT), Software Assurance Tests, Capability Set Integration Events, Risk Reduction Tests, DT and Capability Set Operational Demonstration, Army Interoperability Certification (AIC), Security Control Assessment-Validation, and Initial Operational Test and Evaluation (IOT&E). ***FY 2022 Plans:*** 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			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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. ***FY 2023 Plans:*** Funds support the National Security Agency (NSA) Cybersecurity evaluation and subsequent NSA certification for the BFT-3 (MMC-T) Transceiver Encryption Device (TED), as well as Soldier Touch Point (STP) #1. Funds the required AIC and IOT&E events that support the MMC-S version 3.1 Full Deployment Decision planned for FY23. Additionally, funds DevOps activities for MMC-S version 3.2 that will commence in FY23. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The net funding increase is due to the inclusion of MCE (MMC-S) requirements in FY23 (prior years funded in 0604818/EJ5). Individually, BFT-3 (MMC-T) funding increased due to the addition of Soldier Touch Point and Crypto Certification events. MCE (MMC-S) funding decreased to align with the MDA approved schedule change in which the Initial Operational Test (IOT) moved to FY23 in support of FDD.			
Title: PM Support (Matrix & Contractor) ***Description:*** Matrix and contractor support, including technical, logistics, and business staff oversight, for BFT-3 (MMC-T) and MCE (MMC-S). ***FY 2022 Plans:*** 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). ***FY 2023 Plans:*** Funds continue to support matrix and contractor personnel to support BFT-3 (MMC-T) and MCE (MMC-S) development/systems engineering and provide technical and business oversight for BFT-3 transceiver and encryption device prototypes, and MMC-S software changes. Technical areas include SATCOM, Network, Intel, Cyber, RF, Waveform and Transport. Additionally, this PM support includes system analyses of Program of Record systems and future systems for integration and convergence into the MCE (MMC-S) baselines, technical readiness assessments and assistance with stakeholder technical exchange meetings and events. Business/program management includes funds execution, contract management and logistical support. Some of this work is secured via Functional Support Agreements (FSAs) between PM MC and various Government support agencies, such	1.079	2.386	3.479

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Overall funding increase reflects inclusion of FY 2023 MCE (MMC-S) efforts (prior years funded in 0604818/EJ5).			
Title: SBIR/STTR Transfer ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638	-	0.735	-
Accomplishments/Planned Programs Subtotals	10.674	20.107	40.038

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• W61990: *JOINT BATTLE COMMAND - PLATFORM (JBC-P)*	243.850	253.661	186.515	-	186.515	213.794	240.614	244.014	223.542	Continuing	Continuing

Remarks

Procurement funding (Base funding) is designated for the procurement, fielding, and program management of JBC-P and Mounted Mission Command (starting in FY 2025). 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. Mounted Mission Command will begin to field BFT-3 (MMC-T) in FY 2025.

D. Acquisition Strategy

The JBC-P program achieved First Unit Equipped in FY15 in response to the JBC-P Capabilities Development Document in lieu of Capabilities Production Document (CDD ILO CPD), which was Joint Requirements Oversight Council (JROC) approved in March 2013. Using the CDD ILO CPD objective requirements, PdM JBC-P began Systems Engineering development in FY17 for the program's next generation Blue Force Tracking (BFT) Open Systems Architecture Developmental and systems engineering efforts are being performed through intra-government collaboration with C5ISR's Research and Technology Integration Directorate (RTI) and the Engineering and Systems Integration Directorate (ESI).

At this same time, PdM JBC-P was overseeing development for the Mounted Computing Environment (MCE), which is one of six computing environments in the Common Operating Environment (COE). 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 Warfighting Function (WfF) app capability enhancements.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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Modernization of the JBC-P capability will be accomplished via a MMC Family of Systems (FoS) program approach, which allows the most development flexibility. The MMC FoS addresses the BFT-3 effort (under the MMC Transport (MMC-T) program) and MCE effort (under the MMC Software (MMC-S) program); future programs under the FoS will address network, compute and store requirements. This structure allows maximum flexibility to utilize and respond to technological advances to provide cutting-edge capabilities to the Warfighters and out-pace the obsolescence curve.

BFT-3 (MMC-T) is based on the objective requirements in the JBC-P CDD ILO CPD, the MCE RDP, and the Mounted Mission Command-Hardware & Transport (MMC HW&T) Abbreviated CDD. This program will offer a transport agnostic Modular Open System Approach (MOSA) compliant, resilient, multi-band, multi-path capability that enables Commanders' the ability to perform Mission Command on the Move against near-peer adversaries during Multi Domain Operations in cyber- and electronic warfare-denied environments.

The BFT-3 (MMC-T) Materiel Development Decision (MDD) Acquisition Decision Memorandum (ADM) signed in September 2021, designated BFT-3 (MMC-T) an Acquisition Category II program. The life cycle entry point will be identified based on system maturity and CDD status. BFT-3 (MMC-T) utilizes an approved evolutionary acquisition approach punctuated by prototype development of the BFT-3 transceivers and encryption devices, as well as modular waveforms, which will be subjected to Developmental/Operations (DevOps) and Soldier Touch Points (STPs) to inform a MMC HW&T CDD.

In response to the COE Information System-Initial Capability Document (approved in October 2018) and the MCE Requirements Definition Package (RDP) (approved in October 2018), PdM JBC-P established the MMC-S program to develop MCE capabilities. 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 computing environments (CEs), including 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.

The MCE (MMC-S) MDD ADM signed in June 2020 designated MCE (MMC-S) an Acquisition Category II program and identified its entry into the acquisition life cycle at the Limited Deployment Decision (LDD), which was held for version 3.1 in FY22. MCE (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 MCE (MMC-S) baseline.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY2022 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.735		-		-		-	0.000	0.735	-
		Subtotal	-	-		0.735		-		-		-	0.000	0.735	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BFT-3 (MMC-T) Software/ Systems Engineering	C/FFP	TBD : TBD	69.326	9.475	Nov 2020	16.503	Nov 2021	17.248	Nov 2022	-		17.248	Continuing	Continuing	-
MCE (MMC-S) Software/ Systems Engineering	SS/ Various	Multiple (Government and industry) : Multiple	-	-		-		14.911	Nov 2022	-		14.911	Continuing	Continuing	-
		Subtotal	69.326	9.475		16.503		32.159		-		32.159	Continuing	Continuing	N/A

Remarks

Overall funding increase reflects inclusion of FY 2023 MCE (MMC-S) efforts (prior years funded in 0604818/EJ5).

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support (Matrix / SETA Contractor)	Various	PM JBC-P : Aberdeen Proving Ground (APG), MD	10.395	1.079	Nov 2020	2.386	Nov 2021	3.479	Nov 2022	-		3.479	Continuing	Continuing	-
		Subtotal	10.395	1.079		2.386		3.479		-		3.479	Continuing	Continuing	N/A

Remarks

Overall funding increase reflects inclusion of FY 2023 MCE (MMC-S) efforts (prior years funded in 0604818/EJ5).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BFT-3 (MMC-T) Develop and Conduct Tests and Assessments	MIPR	Multiple : Multiple	30.274	0.120	Oct 2020	0.483	Oct 2021	0.796	Oct 2022	-		0.796	Continuing	Continuing	-
MCE (MMC-S) Develop and Conduct Tests and Assessments	MIPR	Multiple : Multiple	-	-		-		3.604	Nov 2022	-		3.604	Continuing	Continuing	-
		Subtotal	30.274	0.120		0.483		4.400		-		4.400	Continuing	Continuing	N/A

Remarks

Overall, the funding increase is due to the inclusion of MCE (MMC-S) requirements in FY23 (prior years funded in 0604818/EJ5); however BFT-3 (MMC-T) funding increased due to evaluation and certification events and MCE (MMC-S) T&E funding has decreased from FY22 to FY23 to align with FY23 test efforts.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	109.995	10.674		20.107		40.038		-		40.038	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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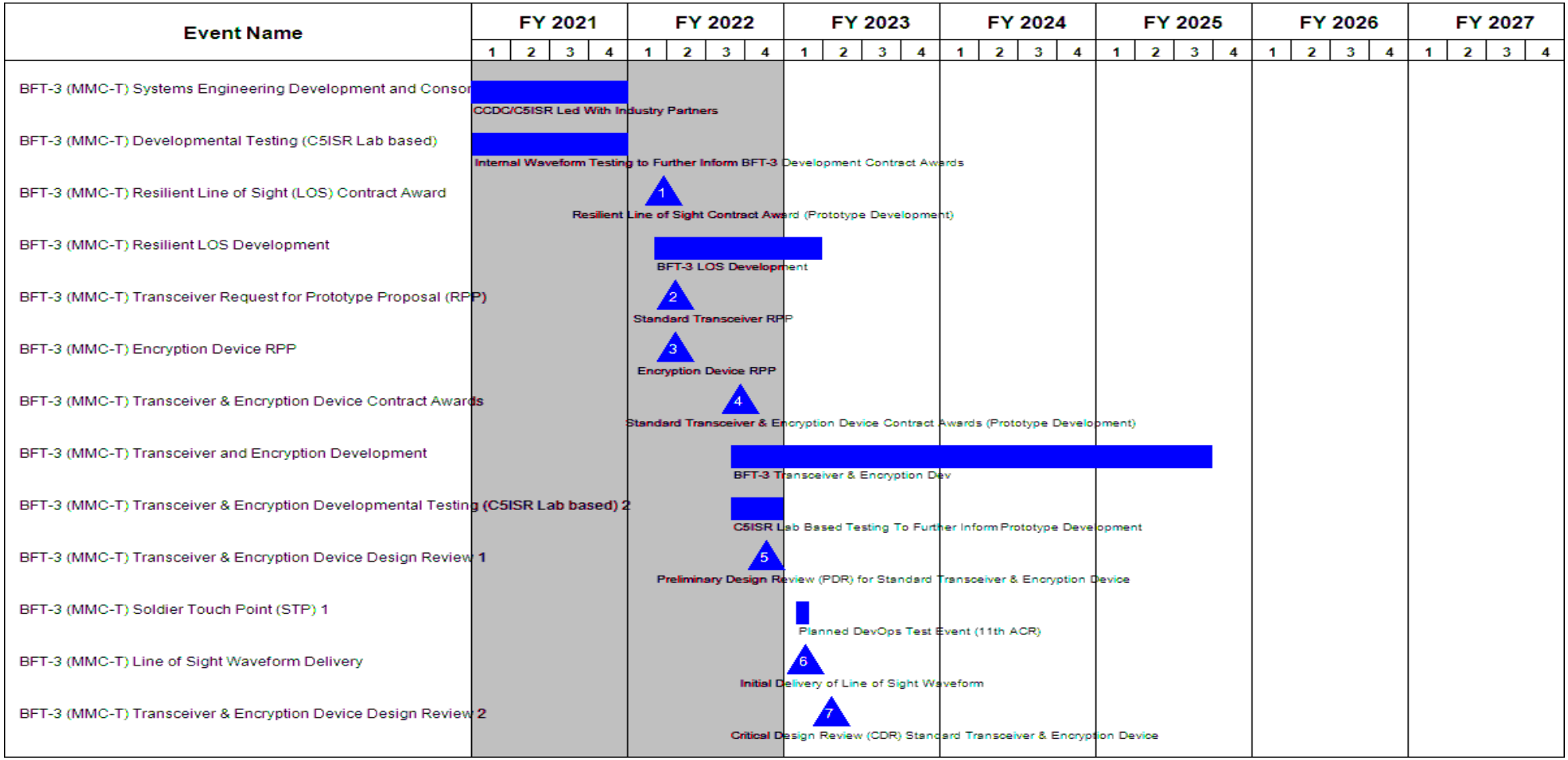

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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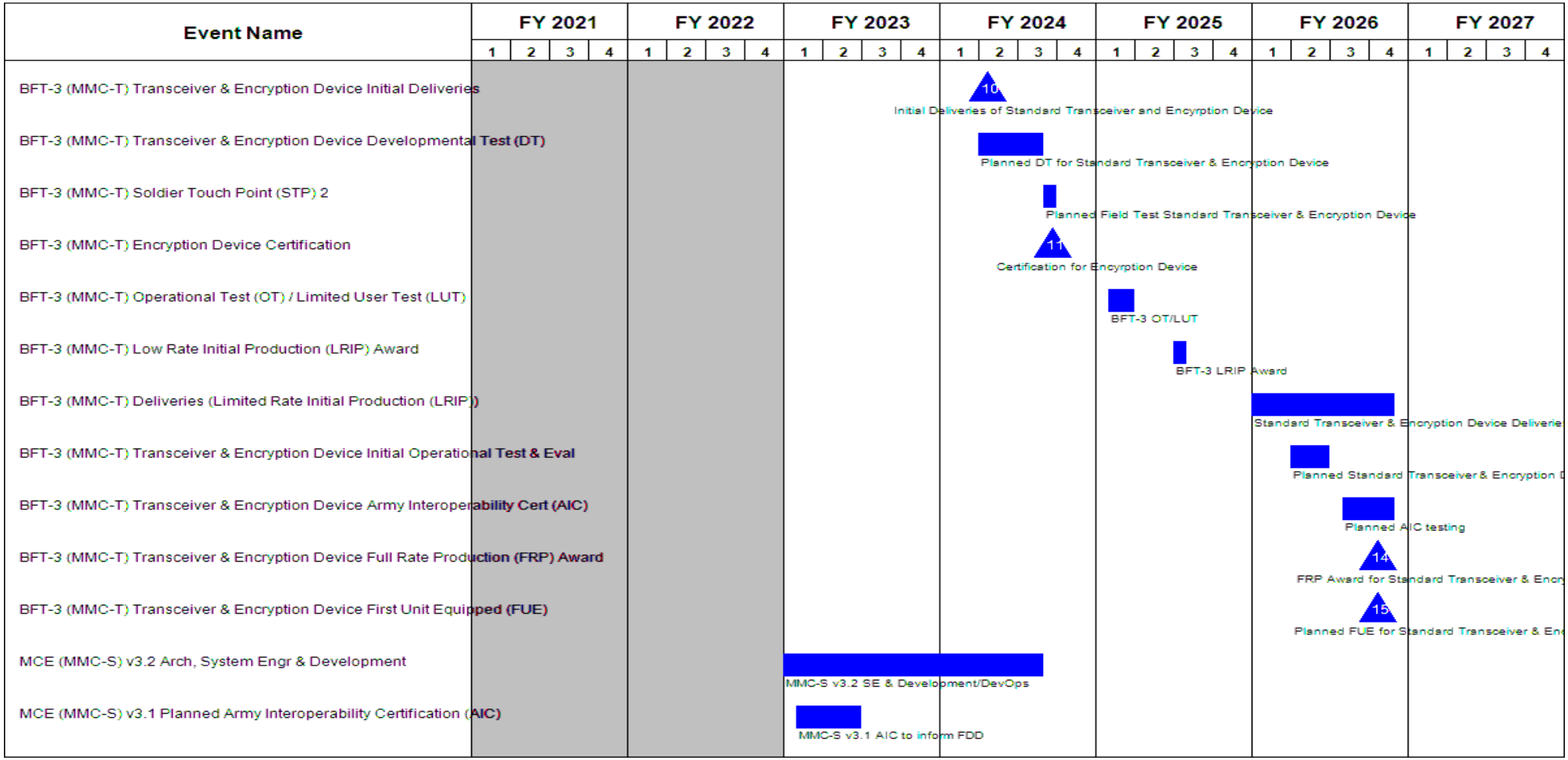
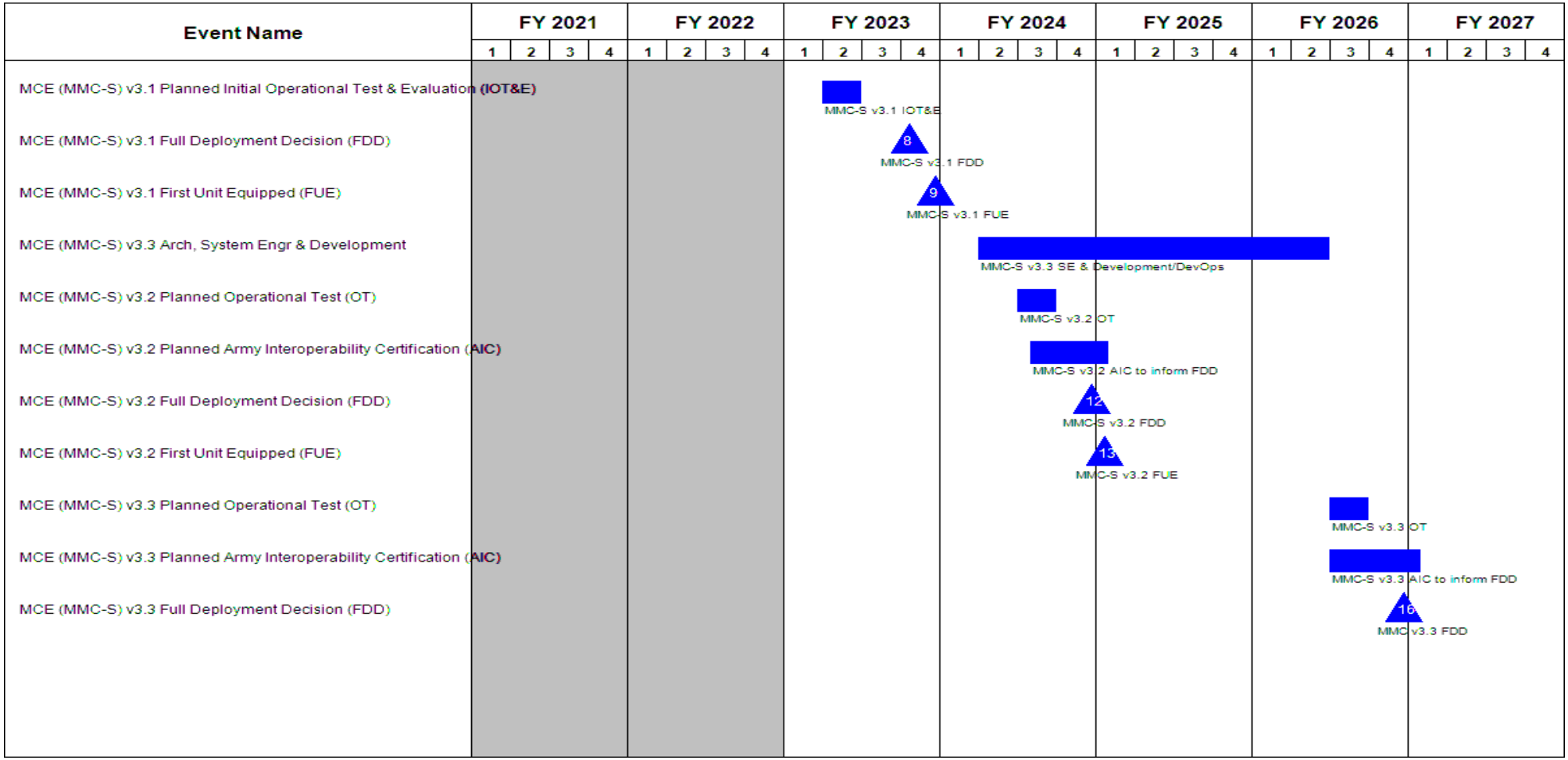


Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604805A / *Command, Control, Communications Systems - Eng Dev*	**Project (Number/Name)** 593 / *Joint Battle Command - Platform (JBC-P)*



Note

Beginning with FY 2023, the Army has realigned Mounted Computing Environment (MCE) (0604818/EJ5) RDT&E funding to this JBC- P RDT&E funding line (PE 0604805A/Proj 593) for the development of the MCE under the Mounted Mission Command - Software (MMC-S) program. These funds will support continued MCE

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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(MMC-S) development as part of the MMC Family of Systems (MMC FoS) strategy for modernizing and replacing the JBC-P capability. Consolidating the RDT&E funding enables agile development and flexibility in support of the MMC-FoS.

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BFT-3 (MMC-T) Systems Engineering Development and Consortium	2	2017	4	2021
BFT-3 (MMC-T) Developmental Testing (C5ISR Lab based)	1	2021	4	2021
BFT-3 (MMC-T) Resilient Line of Sight (LOS) Contract Award	1	2022	1	2022
BFT-3 (MMC-T) Resilient LOS Development	1	2022	1	2023
BFT-3 (MMC-T) Transceiver Request for Prototype Proposal (RPP)	2	2022	2	2022
BFT-3 (MMC-T) Encryption Device RPP	2	2022	2	2022
BFT-3 (MMC-T) Transceiver & Encryption Device Contract Awards	3	2022	3	2022
BFT-3 (MMC-T) Transceiver and Encryption Development	3	2022	3	2025
BFT-3 (MMC-T) Transceiver & Encryption Developmental Testing (C5ISR Lab based) 2	3	2022	4	2022
BFT-3 (MMC-T) Transceiver & Encryption Device Design Review 1	4	2022	4	2022
BFT-3 (MMC-T) Soldier Touch Point (STP) 1	1	2023	1	2023
BFT-3 (MMC-T) Line of Sight Waveform Delivery	1	2023	1	2023
BFT-3 (MMC-T) Transceiver & Encryption Device Design Review 2	2	2023	2	2023
BFT-3 (MMC-T) Transceiver & Encryption Device Initial Deliveries	2	2024	2	2024
BFT-3 (MMC-T) Transceiver & Encryption Device Developmental Test (DT)	2	2024	3	2024
BFT-3 (MMC-T) Soldier Touch Point (STP) 2	3	2024	3	2024
BFT-3 (MMC-T) Encryption Device Certification	3	2024	3	2024
BFT-3 (MMC-T) Operational Test (OT) / Limited User Test (LUT)	1	2025	1	2025
BFT-3 (MMC-T) Low Rate Initial Production (LRIP) Award	3	2025	3	2025
BFT-3 (MMC-T) Deliveries (Limited Rate Initial Production (LRIP))	1	2026	4	2026
BFT-3 (MMC-T) Transceiver & Encryption Device Initial Operational Test & Eval	2	2026	2	2026
BFT-3 (MMC-T) Transceiver & Encryption Device Army Interoperability Cert (AIC)	3	2026	4	2026

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604805A / *Command, Control, Communications Systems - Eng Dev*	**Project (Number/Name)** 593 / *Joint Battle Command - Platform (JBC-P)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BFT-3 (MMC-T) Transceiver & Encryption Device Full Rate Production (FRP) Award	4	2026	4	2026
BFT-3 (MMC-T) Transceiver & Encryption Device First Unit Equipped (FUE)	4	2026	4	2026
MCE (MMC-S) v3.2 Arch, System Engr & Development	1	2023	3	2024
MCE (MMC-S) v3.1 Planned Army Interoperability Certification (AIC)	1	2023	2	2023
MCE (MMC-S) v3.1 Planned Initial Operational Test & Evaluation (IOT&E)	2	2023	2	2023
MCE (MMC-S) v3.1 Full Deployment Decision (FDD)	4	2023	4	2023
MCE (MMC-S) v3.1 First Unit Equipped (FUE)	4	2023	4	2023
MCE (MMC-S) v3.3 Arch, System Engr & Development	2	2024	2	2026
MCE (MMC-S) v3.2 Planned Operational Test (OT)	3	2024	3	2024
MCE (MMC-S) v3.2 Planned Army Interoperability Certification (AIC)	3	2024	1	2025
MCE (MMC-S) v3.2 Full Deployment Decision (FDD)	4	2024	4	2024
MCE (MMC-S) v3.2 First Unit Equipped (FUE)	1	2025	1	2025
MCE (MMC-S) v3.3 Planned Operational Test (OT)	3	2026	3	2026
MCE (MMC-S) v3.3 Planned Army Interoperability Certification (AIC)	3	2026	1	2027
MCE (MMC-S) v3.3 Full Deployment Decision (FDD)	4	2026	4	2026

Note

Beginning with FY 2023, the Army has realigned Mounted Computing Environment (MCE) (0604818/EJ5) RDT&E funding to this JBC- P RDT&E funding line (PE 0604805A/Proj 593) for the development of the MCE under the Mounted Mission Command - Software (MMC-S) program. These funds will support continued MCE (MMC-S) development as part of the MMC Family of Systems (MMC FoS) strategy for modernizing and replacing the JBC-P capability. Consolidating the RDT&E funding enables agile development and flexibility in support of the MMC-FoS.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604807A *I Medical Materiel/Medical Biological Defense Equipment - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	48.285	44.400	5.513	-	5.513	6.598	7.615	7.011	7.078	0.000	126.500
812: *Mil HIV Vac&Drug Dev*	-	1.184	-	-	-	-	-	-	-	-	0.000	1.184
832: *Field Medical Systems Engineering Development*	-	31.244	27.437	5.513	-	5.513	6.598	7.615	7.011	7.078	0.000	92.496
849: *Infec Dis Drug/Vacc Ed*	-	15.857	16.963	-	-	-	-	-	-	-	0.000	32.820

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 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) of the U.S. Army Medical Research and Development Command.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604807A *I Medical Materiel/Medical Biological Defense Equipment - Eng Dev*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	51.285	44.424	0.000	-	0.000
Current President's Budget	48.285	44.400	5.513	-	5.513
Total Adjustments	-3.000	-0.024	5.513	-	5.513
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.000	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	5.513	-	5.513
• FFRDC Transfer	-	-0.024	-	-	-

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 812 / *Mil HIV Vac&Drug Dev*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
812: *Mil HIV Vac&Drug Dev*	-	1.184	-	-	-	-	-	-	-	-	0.000	1.184
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 2021	FY 2022	FY 2023
Title: Military HIV Vaccine and Drug Development	1.184	-	-
Description: 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.			
Accomplishments/Planned Programs Subtotals	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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 812 / *Mil HIV Vac&Drug Dev*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development Management Services Cost	Various	Various : Various	3.677	0.491		-		-		-		-	Continuing	Continuing	-
		Subtotal	3.677	0.491		-		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development Cost	Various	Henry M. Jackson Foundation, : Various	33.967	-		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	33.967	-		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development Support Cost	Various	Various : Various	2.413	-		-		-		-		-	Continuing	Continuing	-
Regulatory Support	Option/ Various	Clinical Research Management,Inc : Various	0.909	-		-		-		-		-	0.000	0.909	-
		Subtotal	3.322	-		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development T&E Cost	Various	Various : Various	29.484	0.693		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	29.484	0.693		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 812 / *Mil HIV Vac&Drug Dev*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	70.450	1.184		-		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 812 / *Mil HIV Vac&Drug Dev*

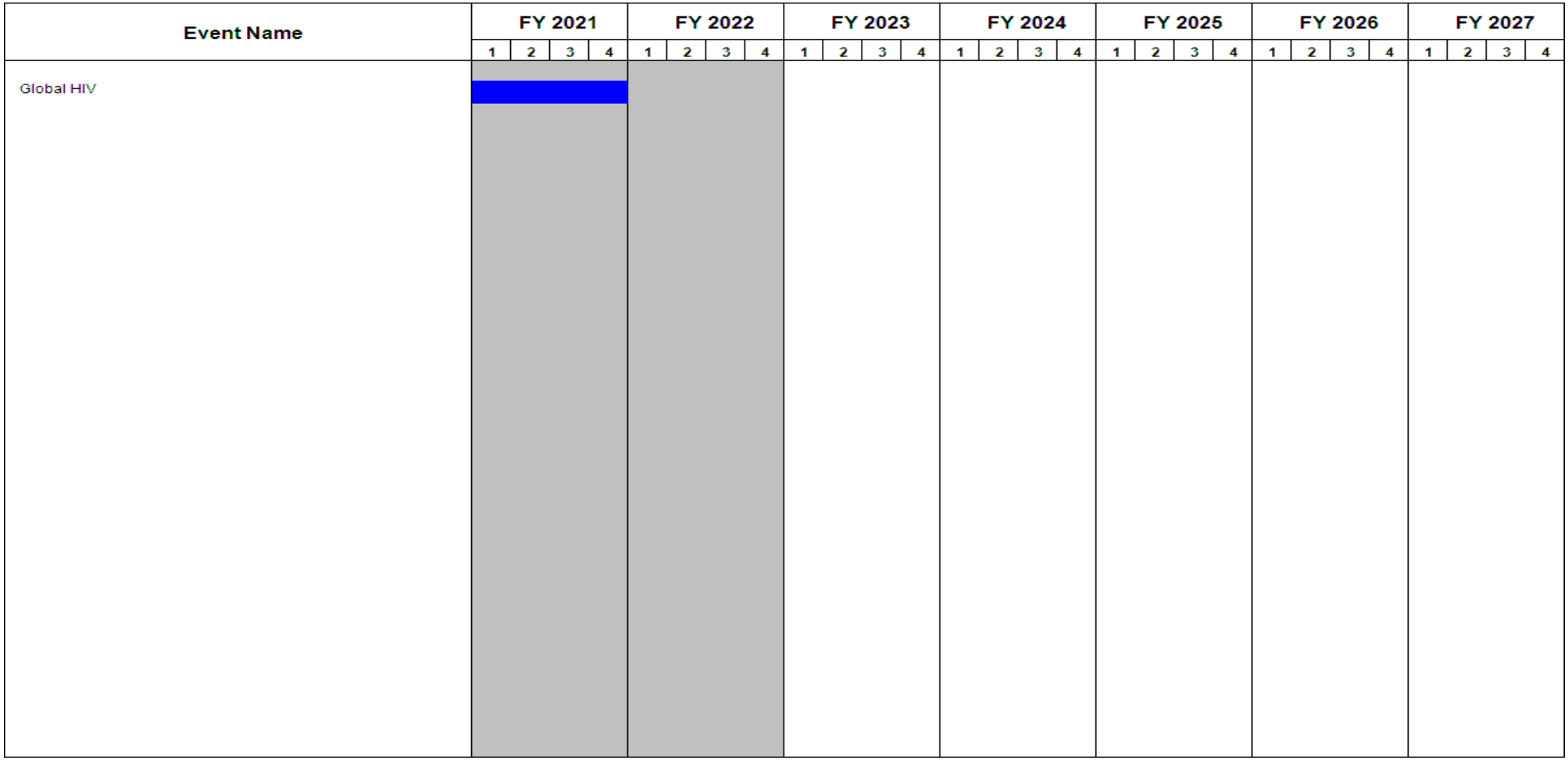

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 812 / *Mil HIV Vac&Drug Dev*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Global HIV	1	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 832 / *Field Medical Systems Engineering Development*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
832: *Field Medical Systems Engineering Development*	-	31.244	27.437	5.513	-	5.513	6.598	7.615	7.011	7.078	0.000	92.496
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. Commercially available medical products are also evaluated for military use. This project 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. Project Managers also consider reductions to 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)	FY 2021	FY 2022	FY 2023
Title: Field Medical Systems Engineering Development PM Warfighter Protection and Acute Care ***Description:*** Funding is provided for engineering and manufacturing development of medical products for enhanced combat casualty care and follow-on care, including blood products.	9.419	-	-
Title: Field Medical Systems Engineering Development PM Warfighter Health, Performance and Evacuation (formerly PM Medical Support Systems) ***Description:*** This project funds the engineering and manufacturing development of medical products for prevention of injury, enhanced combat casualty care, and evacuation.	11.308	-	-
Title: Field Medical Systems Engineering Development - PM Warfighter Brain Health ***Description:*** This effort funds systems engineering development of medical products for enhanced combat casualty care for diagnosis of Traumatic Brain Injury (TBI).	10.517	-	-
Title: Field Medical Systems Engineering Development - Medical Readiness ***Description:*** Funding is provided for engineering and manufacturing development of medical products for diagnostic devices and testing of medical devices for use in the field. ***FY 2022 Plans:*** 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.	-	11.236	5.513

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 832 / *Field Medical Systems Engineering Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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. ***FY 2023 Plans:*** Laboratory Assay for TBI- Point of Care: Funding and mission realigned as part of US Army Medical Research and Development Command transfer to the Defense Health Agency in order to meet Congressional intent as outlined in National Defense Authorization Act 2019 (Sections 711) and NDAA 2020 (Section 737). Funding transferred to Program Element 0605145DHA, Project Code 375D. Medical Device Prototype Development and Testing (formerly Modernization of medical equipment sets): Continue to provide rapid prototype design; fabrication; evaluation and testing; and fixes for medical and medical support products, components and systems as well as harden COTS products for use in a field environment used to sustain and support the Warfighter. Continue to conduct Developmental Test and Evaluation (DT&E) as required by Army and DoD regulations, consisting of Environmental T&E IAW Mil-STD-810G; Performance Verification Testing; and Competitive Analysis. Airworthiness Certification: Continue tests both developmental and commercial off-the-shelf (COTS) carry-on medical equipment destined for use aboard Army aircraft required by AR 70-62, for Medical Equipment Set and Mission Essential Package with products ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding and mission realigned as part of US Army Medical Research and Development Command transfer to the Defense Health Agency in order to meet Congressional intent as outlined in National Defense Authorization Act 2019 (Sections 711) and NDAA 2020 (Section 737). Funding transferred to Program Element 0605145DHA, Project Code 375D.			
Title: Field Medical Systems Engineering Development - Battlefield Care and Return to Fight	-	15.346	-
Description: Funding is provided for engineering and manufacturing development of medical products for enhanced combat casualty care and follow-on care, including blood products. ***FY 2022 Plans:*** 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 832 / *Field Medical Systems Engineering Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Cryopreserved Platelets: Will continue non-clinical in-Vitro characterization and Phase 2 Clinical Trial efficacy study. 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding and mission realigned as part of US Army Medical Research and Development Command transfer to the Defense Health Agency in order to meet Congressional intent as outlined in National Defense Authorization Act 2019 (Sections 711) and NDAA 2020 (Section 737). Funding transferred to Program Element 0605145DHA, Project Code 375D.			
Title: SBIR/STTR Tax ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638.	-	0.855	-
Accomplishments/Planned Programs Subtotals	31.244	27.437	5.513

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 832 / *Field Medical Systems Engineering Development*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development Management Services Cost	Various	Various : Various	53.652	7.220		2.726		2.122		-		2.122	Continuing	Continuing	Continuing
Medical Product Development Management Services Cost	PO	General Dynamics Information Technology : Frederick MD	0.752	-		0.300		-		-		-	0.000	1.052	-
FY22 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.855		-		-		-	0.000	0.855	-
		Subtotal	54.404	7.220		3.881		2.122		-		2.122	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development Cost	Various	Various : Various	10.928	1.968		0.691		1.631		-		1.631	Continuing	Continuing	Continuing
Cryopreserved Platelets	Various	TBD : TBD	7.111	3.804		3.514		-		-		-	0.000	14.429	-
Assay for Traumatic Brain Injury	C/Various	Abbott Laboratories : Chicago, IL	21.643	7.271		6.470		-		-		-	Continuing	Continuing	Continuing
Handheld Ultrasound	Various	TBD : TBD	-	-		1.461		-		-		-	Continuing	Continuing	Continuing
Extremity Injury Repair - Vascular	TBD	Humacyte : Morrisville, NC	-	-		2.541		-		-		-	0.000	2.541	-
		Subtotal	39.682	13.043		14.677		1.631		-		1.631	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Device Prototype Development and Testing	Various	Various : Various	13.677	2.842		-		-		-		-	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 832 / *Field Medical Systems Engineering Development*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Equipment Sets Development	Various	Various : Various	2.670	1.310		-		-		-		-	0.000	3.980	-
Airworthiness Certification	TBD	Various : Various	1.374	1.621		1.813		1.760		-		1.760	0.000	6.568	-
		Subtotal	17.721	5.773		1.813		1.760		-		1.760	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development T&E Cost	Various	Various : Various	18.291	0.360		-		-		-		-	Continuing	Continuing	Continuing
Cryopreserved Platelets	C/CPFF	Cellphire : Rockville, MD	17.996	-		1.246		-		-		-	0.000	19.242	-
Medical Equipment Sets Development	Various	Various : Various	5.705	1.456		-		-		-		-	0.000	7.161	-
Freeze Dried Plasma	C/CPFF	Westat : Rockville, MD	14.991	3.392		5.820		-		-		-	0.000	24.203	-
		Subtotal	56.983	5.208		7.066		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	168.790	31.244		27.437		5.513		-		5.513	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 832 / *Field Medical Systems Engineering Development*

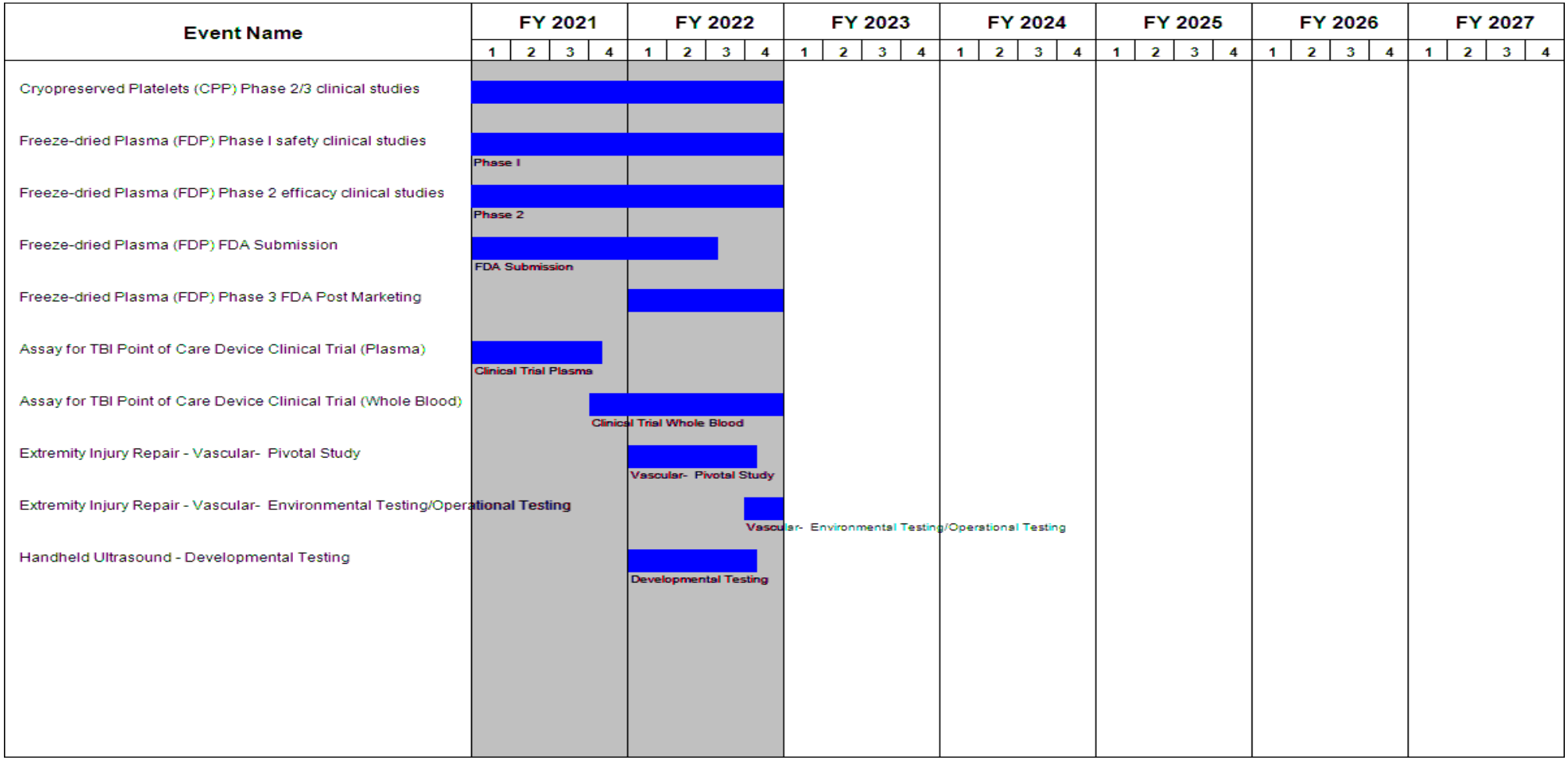

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 832 / *Field Medical Systems Engineering Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Cryopreserved Platelets (CPP) Phase 2/3 clinical studies	3	2017	4	2022
Freeze-dried Plasma (FDP) Phase I safety clinical studies	3	2014	4	2022
Freeze-dried Plasma (FDP) Phase 2 efficacy clinical studies	2	2016	4	2022
Freeze-dried Plasma (FDP) FDA Submission	1	2021	3	2022
Freeze-dried Plasma (FDP) Phase 3 FDA Post Marketing	1	2022	4	2022
Assay for TBI Point of Care Device Clinical Trial (Plasma)	1	2021	4	2021
Assay for TBI Point of Care Device Clinical Trial (Whole Blood)	4	2021	4	2022
Extremity Injury Repair - Vascular- Pivotal Study	1	2022	4	2022
Extremity Injury Repair - Vascular- Environmental Testing/Operational Testing	4	2022	4	2022
Handheld Ultrasound - Developmental Testing	1	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 849 / *Infec Dis Drug/Vacc Ed*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
849: *Infec Dis Drug/Vacc Ed*	-	15.857	16.963	-	-	-	-	-	-	-	0.000	32.820
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 endemic 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 2021	FY 2022	FY 2023
Title: Infectious Disease Drug and Vaccine Engineering Development ***Description:*** 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.	15.857	-	-
Title: Infectious Disease Drug and Vaccine Engineering Development - Medical Readiness ***Description:*** 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. ***FY 2022 Plans:*** 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.	-	12.329	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 849 / *Infec Dis Drug/Vacc Ed*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding and mission realigned as part of US Army Medical Research and Development Command transfer to the Defense Health Agency in order to meet Congressional intent as outlined in National Defense Authorization Act 2019 (Sections 711) and NDAA 2020 (Section 737). Funding transferred to Program Element 0605145DHA, Project Code 375D.			
Title: Infectious Disease Drug and Vaccine Engineering Development - Battlefield Care and Return to Fight ***Description:*** 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 ***FY 2022 Plans:*** 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding and mission realigned as part of US Army Medical Research and Development Command transfer to the Defense Health Agency in order to meet Congressional intent as outlined in National Defense Authorization Act 2019 (Sections 711) and NDAA 2020 (Section 737). Funding transferred to Program Element 0605145DHA, Project Code 375D.	-	4.112	-
Title: SBIR/STTR Tax ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC ?638. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC ?638.	-	0.522	-
Accomplishments/Planned Programs Subtotals	15.857	16.963	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 849 / *Infec Dis Drug/Vacc Ed*

D. Acquisition Strategy

To support testing and evaluation of in-house and commercially developed products in government-managed trials to meet FDA requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 849 / *Infec Dis Drug/Vacc Ed*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medical Product Development Management Services Cost	Various	Various : Various	28.949	3.612		0.500		-		-		-	Continuing	Continuing	Continuing
Medical Product Development Management Services Cost	C/CPFF	General Dynamics Information Technology : Frederick MD	14.342	0.333		1.884		-		-		-	0.000	16.559	-
FY22 SBIR/STTR Transfer	TBD	Various : Various	-	-		0.522		-		-		-	0.000	0.522	-
		Subtotal	43.291	3.945		2.906		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Rapid Human Diagnostics	Various	Inbios, Inc : Seattle WA	3.443	-		3.684		-		-		-	0.000	7.127	-
CARES ACT	TBD	TBD : TBD	24.417	-		-		-		-		-	0.000	24.417	-
Rapid Human Diagnostics	TBD	Cepheid : California	-	3.055		-		-		-		-	0.000	3.055	-
		Subtotal	27.860	3.055		3.684		-		-		-	0.000	34.599	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Dengue Tetravalent Vaccine	TBD	WRAIR/AFRIMS : Silver Spring MD	2.649	0.791		0.861		-		-		-	0.000	4.301	-
Dengue Tetravalent Vaccine	C/TBD	BioPath : Philippines	6.744	0.911		1.017		-		-		-	0.000	8.672	-
Malaria Prophylactic Drug - Tafenoquine	Various	DVC : Frederick MD	5.385	3.988		3.520		-		-		-	0.000	12.893	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	Project (Number/Name) 849 / *Infec Dis Drug/Vacc Ed*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Human Immunodeficiency Virus Vaccine (HIVV)	Various	Janssen Vaccines & Prevention B.V. : Netherlands	-	-		3.313		-		-		-	0.000	3.313	-
Human Immunodeficiency Virus Vaccine (HIVV)	TBD	PPD : Wilmington, NC	-	-		1.662		-		-		-	0.000	1.662	-
Malaria Treatment Drug - Intravenous Dengue Tetravalent VaccineArtesunate	TBD	Amivas : Frederick MD	-	2.029		-		-		-		-	0.000	2.029	-
Malaria Prophylactic Drug - Tafenoquine	TBD	60P : Washington, DC	-	1.138		-		-		-		-	0.000	1.138	-
		Subtotal	14.778	8.857		10.373		-		-		-	0.000	34.008	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	85.929	15.857		16.963		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 849 / *Infec Dis Drug/Vacc Ed*

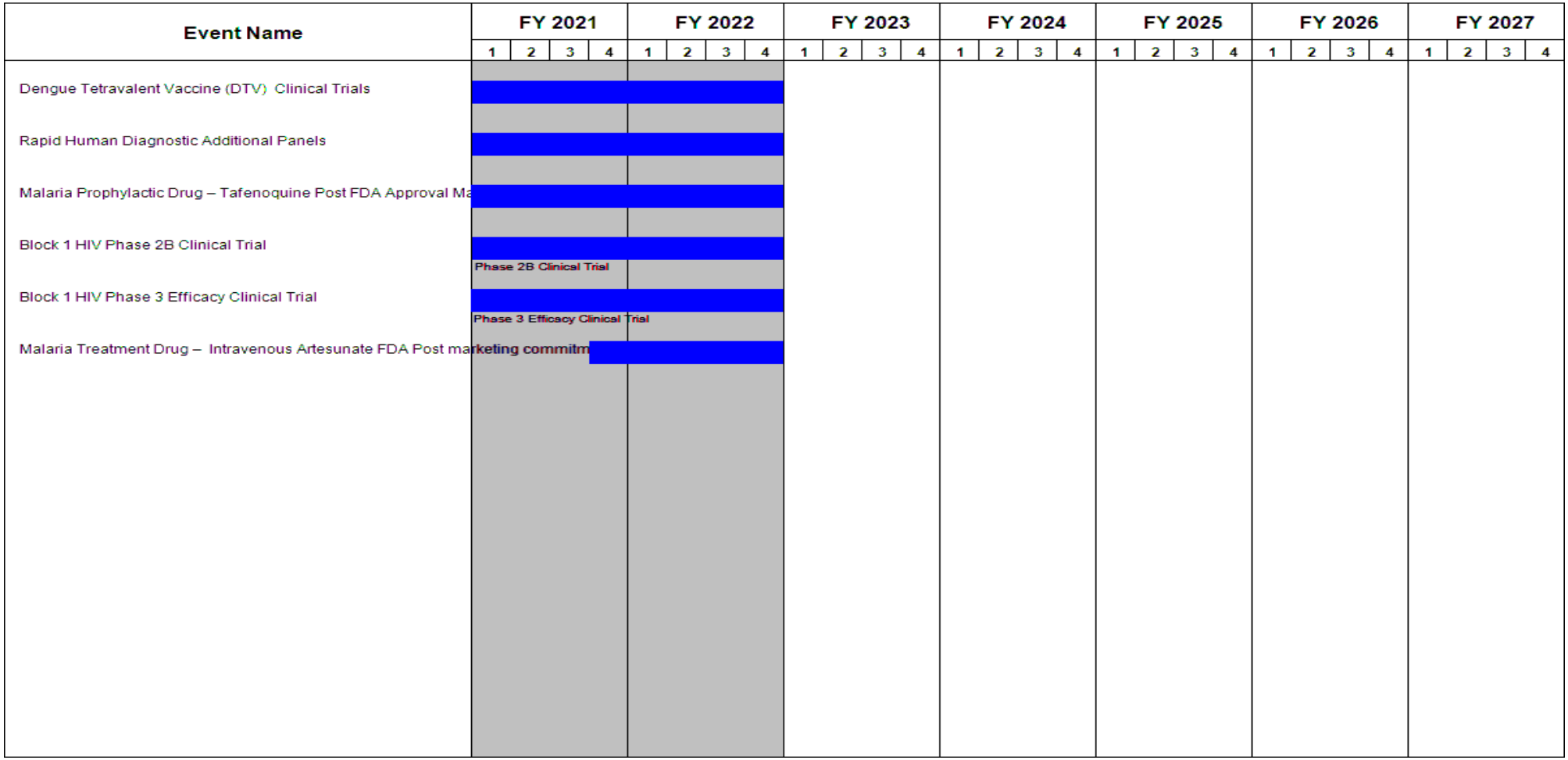

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604807A / *Medical Materiel/Medical Biological Defense Equipment - Eng Dev*	**Project (Number/Name)** 849 / *Infec Dis Drug/Vacc Ed*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Dengue Tetravalent Vaccine (DTV) Clinical Trials	1	2011	4	2022
Rapid Human Diagnostic Additional Panels	1	2020	4	2022
Malaria Prophylactic Drug ? Tafenoquine Post FDA Approval Marketing Studies	4	2019	4	2022
Block 1 HIV Phase 2B Clinical Trial	1	2017	4	2022
Block 1 HIV Phase 3 Efficacy Clinical Trial	4	2019	4	2022
Malaria Treatment Drug ? Intravenous Artesunate FDA Post marketing commitments	4	2021	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army											Date: April 2022	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604808A *I Landmine Warfare/Barrier - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	9.239	29.137	12.150	-	12.150	12.473	11.977	11.977	1.997	0.000	88.950
016: *Close Combat Capabilities ENG DEV*	-	9.139	26.174	10.000	-	10.000	10.000	10.000	10.000	-	0.000	75.313
415: *Mine Neutral/Detection*	-	0.100	-	-	-	-	-	-	-	-	0.000	0.100
CS2: *Render Safe Sets Kits and Outfits (RS-SKO)*	-	-	0.916	1.026	-	1.026	1.030	1.977	1.977	1.997	0.000	8.923
CS3: *Next Generation Advanced Bomb Suit (NGABS)*	-	-	2.047	1.124	-	1.124	1.443	-	-	-	0.000	4.614

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: 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.

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 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.

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 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army	Date: April 2022
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604808A *I Landmine Warfare/Barrier - Eng Dev*

Project CS2: Project CS2: 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 in multi-domain operations (MDO). Technical refresh of capabilities ensures AimPoint formations maintain overmatch capability. EOD RS-SKO equips EOD teams with low light visual augmentation system, electronic countermeasures, subsurface explosive and hazard 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 among information reporting and control systems.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	9.239	14.137	0.000	-	0.000
Current President's Budget	9.239	29.137	12.150	-	12.150
Total Adjustments	0.000	15.000	12.150	-	12.150
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	15.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	12.150	-	12.150

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: 016: *Close Combat Capabilities ENG DEV*		
Congressional Add: *Prototype Integration for Multi-Domain Operations - Congressional Add*	-	15.000
Congressional Add Subtotals for Project: 016	-	15.000
Congressional Add Totals for all Projects	-	15.000

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 016 / *Close Combat Capabilities ENG DEV*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
016: *Close Combat Capabilities ENG DEV*	-	9.139	26.174	10.000	-	10.000	10.000	10.000	10.000	-	0.000	75.313
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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)	FY 2021	FY 2022	FY 2023
Title: Next Generation Advanced Bomb Suit (NGABS)	6.351	-	-
Description: 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.			
Title: FY22 SBIR/STTR Transfer	-	0.407	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: Funding transferred in accordance with Title 15 USC 638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC 638			
Title: Explosive Ordnance Disposal (EOD) Render Safe (RS) ***Description:*** Render Safe (RS) procedures require technicians to employ a wide variety of capabilities and explosives. ***FY 2022 Plans:*** FY 2022 funding will support the build of the final Electronic Countermeasure (ECM) design prototypes and the testing of the final prototypes against requirements. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Project 016 / Close Combat Capabilities - Eng Dev within Program Element (PE) 0604808A / Landmine Warfare/Barrier - Eng Dev restructures to Project CS2 / Render Safe Sets Kits and Outfits (RS-SKO) within Program Element (PE) 0604808A / Landmine Warfare/Barrier - Eng Dev in Fiscal Year (FY) 2022.	2.788	0.072	-
Title: Prototype Integration for Multi-Domain Operations ***Description:*** 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. ***FY 2022 Plans:*** FY 2022 funding 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. ***FY 2023 Plans:***	-	10.695	10.000

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 funding in the amount of $10 million will continue the integration of 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in funding from FY 2022 to FY 2023 to align with Army strategic priorities.			
Accomplishments/Planned Programs Subtotals	9.139	11.174	10.000

	FY 2021	FY 2022
Congressional Add: Prototype Integration for Multi-Domain Operations - Congressional Add	-	15.000
FY 2022 Plans: FY 2022 Congressional Add funding will support integrating additional prototype efforts to enable Army operational initiative, freedom of movement, and system survivability aligned to Army 6+2 modernization priorities. Integration will provide enhanced force protection and signature management related to critical mission threads, operational constructs (Multi-Domain Operations) and key weapon systems. Provides research, development, test, evaluation, support and training of information operations related technology and activities. Continues development of multiple systems aligned to full-spectrum signature management in coordination with relevant stakeholders. Conduct Research, Development, Test and Evaluation efforts toward new systems, to include next generation efforts as recommended during the POM review.		
Congressional Adds Subtotals	-	15.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• R63610: *Render Safe Sets kits Outfits*	145.313	84.000	0.000	-	0.000	-	5.078	2.277	2.277	Continuing	Continuing
• CS2: *Render Safe Sets Kits and Outfits (RS-SKO)*	-	0.916	1.026	-	1.026	1.030	1.977	1.977	1.997	0.000	8.923

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

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 Electronic Countermeasure (ECM) 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.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 016 / *Close Combat Capabilities ENG DEV*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS	Allot	PM SPE : Fort Belvoir	2.504	0.900		-		-		-		-	0.000	3.404	Continuing
SBIR/STTR 016	TBD	Various : Various	-	-		0.407		-		-		-	Continuing	Continuing	Continuing
		Subtotal	2.504	0.900		0.407		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS - Production Prototype Development	C/FFP	TBD : Manufacturing Techniques Inc. (MTEQ), Lorton, VA	13.944	2.899		-		-		-		-	0.000	16.843	Continuing
EOD RS Development Contract 1	MIPR	Northrop Grumman Corporation : Falls Church, VA	2.000	-		-		-		-		-	0.000	2.000	Continuing
EOD RS Development Contract 2	MIPR	Sierra Nevada Corporation : Sparks, NV	2.000	-		-		-		-		-	0.000	2.000	Continuing
EOD RS Development Contract 3	MIPR	Peraton Corporation : Herndon, VA	1.921	-		-		-		-		-	0.000	1.921	Continuing
EOD RS Follow On Development Contract	MIPR	Peraton Corporation : Herndon, VA	-	1.954	Feb 2022	-		-		-		-	0.000	1.954	Continuing
Prototype Integration for Multi-Domain Opertions	TBD	TBD : TBD	-	-		10.695	Jan 2022	10.000	Mar 2023	-		10.000	0.000	20.695	Continuing
Prototyp Integration for Multi-Domain Operations - Cong Add	TBD	TBD : TBD	-	-		15.000	Apr 2022	-		-		-	0.000	15.000	-
		Subtotal	19.865	4.853		25.695		10.000		-		10.000	0.000	60.413	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 016 / *Close Combat Capabilities ENG DEV*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Support Costs	MIPR	TBD : Various	2.414	2.126		-		-		-		-	0.000	4.540	Continuing
EOD RS	MIPR	DEVCOM C5ISR Center : Aberdeen Proving Ground (APG), MD	0.959	0.687	Mar 2021	-		-		-		-	0.000	1.646	Continuing
EOD RS	MIPR	DEVCOM Armaments Center : PIcatinny Arsenal, NJ	-	-		0.072	May 2022	-		-		-	0.000	0.072	Continuing
		Subtotal	3.373	2.813		0.072		-		-		-	0.000	6.258	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
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	-		-		-		-		-	0.000	0.342	Continuing
EOD RS	MIPR	MRIGlobal : Kansas City, MO	-	0.147	May 2021	-		-		-		-	0.000	0.147	Continuing
		Subtotal	7.969	0.573		-		-		-		-	0.000	8.542	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	33.711	9.139		26.174		10.000		-		10.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

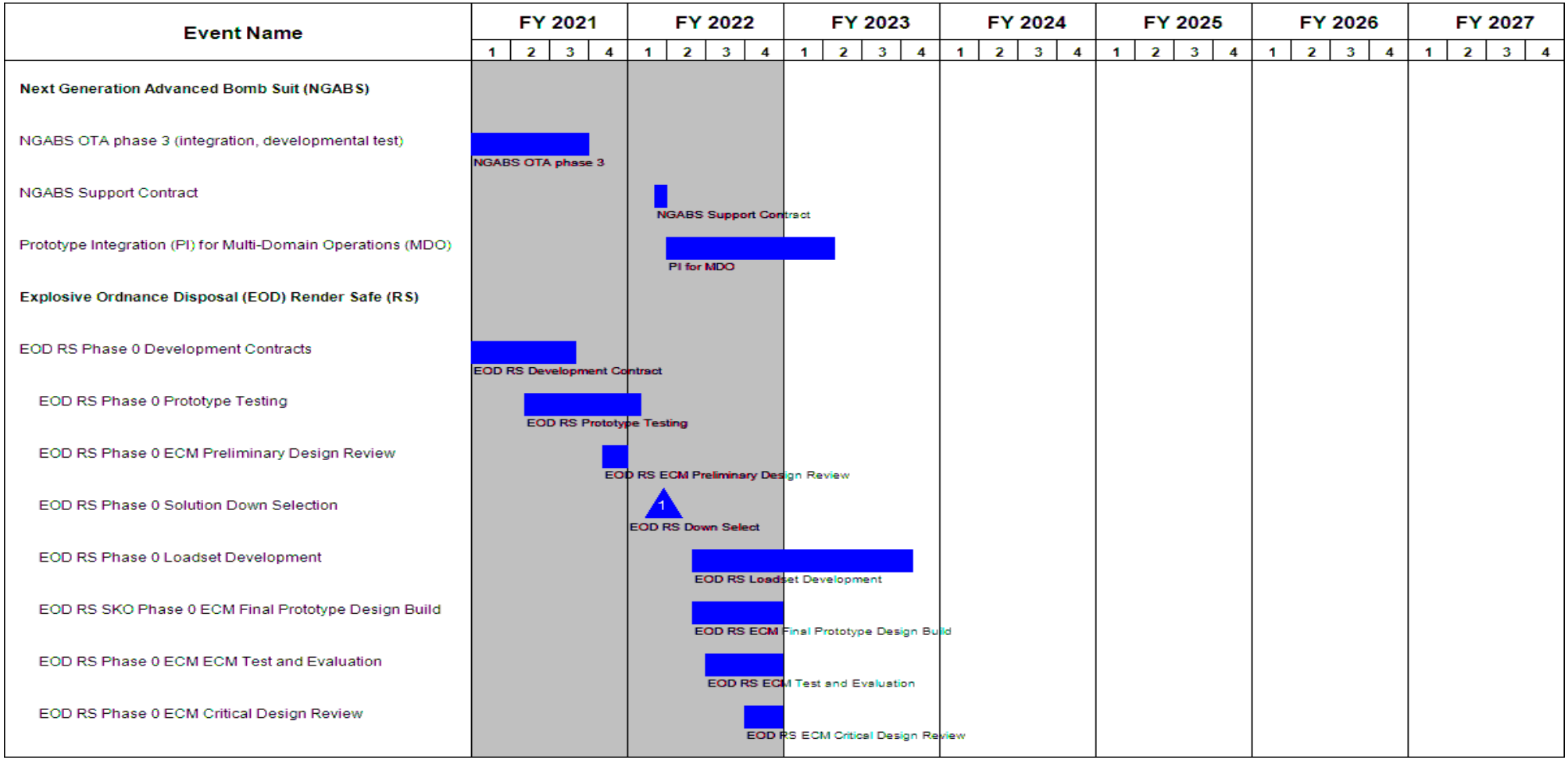

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

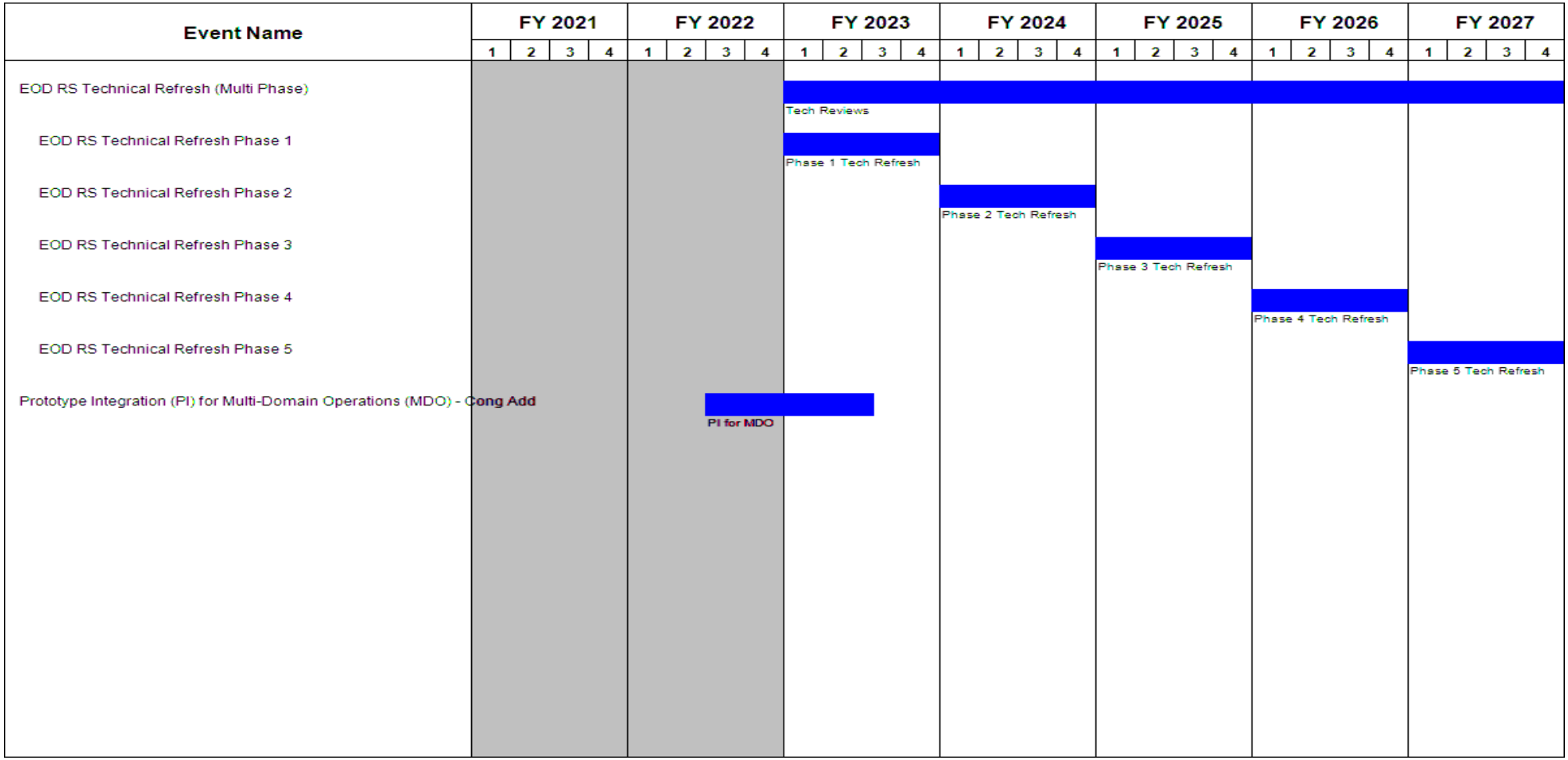

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

Schedule Details

	Start		End	
Events	**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	2	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	1	2022
EOD RS Phase 0 ECM Preliminary Design Review	4	2021	4	2021
EOD RS Phase 0 Solution Down Selection	1	2022	1	2022
EOD RS Phase 0 Loadset Development	2	2022	4	2023
EOD RS SKO Phase 0 ECM Final Prototype Design Build	2	2022	4	2022
EOD RS Phase 0 ECM ECM Test and Evaluation	3	2022	4	2022
EOD RS Phase 0 ECM Critical Design Review	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

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 016 / *Close Combat Capabilities ENG DEV*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
EOD RS Technical Refresh Phase 5	1	2027	4	2027
Prototype Integration (PI) for Multi-Domain Operations (MDO) - Cong Add	3	2022	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 415 / *Mine Neutral/Detection*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
415: *Mine Neutral/Detection*	-	0.100	-	-	-	-	-	-	-	-	0.000	0.100
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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 415 / *Mine Neutral/Detection*

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. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Robotic Explosive Hazard Detection System (REHDS)	0.100	-	-
Description: Robotic Explosive Hazard Detection System (REHDS)			
Accomplishments/Planned Programs Subtotals	0.100	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• R64001: *HUSKY MOUNTED DETECTION SYSTEM (HMDS)*	95.608	26.823	0.000	-	0.000	-	-	-	-	0.000	122.431
• R68102: *GRND STANDOFF MINE DETECTN SYSM (GSTAMIDS)BLK 1*	2.497	-	0.000	-	0.000	-	-	-	-	0.000	2.497
• DA0924: *Modification Of In Svc Equip*	62.712	212.349	31.819	-	31.819	43.620	141.407	208.505	274.860	0.000	975.272
• R64003: *HMDS - DEEP BURIED DETECTION*	71.882	15.300	0.000	-	0.000	-	-	-	-	0.000	87.182

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.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 415 / *Mine Neutral/Detection*

The Route Clearance & 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.

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.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS System Engineering & Program Management	MIPR	PM Terrestrial Sensors : Fort Belvoir. VA	5.134	-		-		-		-		-	0.000	5.134	-
Program Management - RCIS Type I	MIPR	PM FP : Warren, MI	5.564	-		-		-		-		-	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	-
		Subtotal	16.190	-		-		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS A1 Dev of Engineering Change Proposal w/ Wire Detect and InfraRed	SS/FFP	Chemring Sensors & Electronic Systems (CSES) : Dulles, VA	27.172	-		-		-		-		-	0.000	27.172	-
HMDS Auto-height improvements	C/CPFF	TBD : TBD	0.652	-		-		-		-		-	0.000	0.652	-
HMDS Systtems Training Product Development	MIPR	CECOM : Various	1.757	-		-		-		-		-	0.000	1.757	-
RCIS Type I	SS/FFP	J C Bamford : Pooler, GA	11.585	-		-		-		-		-	0.000	11.585	Continuing
RCIS Type I test assets	MIPR	Letterkenny Army Depot : Letterkenny, PA	2.252	-		-		-		-		-	0.000	2.252	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RCIS Type I SAC	C/CPIF	QinetiQ : Waltham, MA	7.534	-		-		-		-		-	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	-
		Subtotal	87.038	-		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS - Program and Logistics Support	MIPR	Various : Various	0.946	-		-		-		-		-	0.000	0.946	-
RCIS Type I	MIPR	TARDEC, TACOM : Warren, MI	8.688	-		-		-		-		-	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	-	0.100	Mar 2021	-		-		-		-	0.000	0.100	-
		Subtotal	23.310	0.100		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) 415 / *Mine Neutral/Detection*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HMDS ATEC Testing	MIPR	ATEC : Alexandria, VA	9.295	-		-		-		-		-	0.000	9.295	-
HMDS Test Support	MIPR	CECOM : Various	1.778	-		-		-		-		-	0.000	1.778	-
RCIS Type I	MIPR	ATEC : Aberdeen, MD	2.664	-		-		-		-		-	0.000	2.664	-
SREHD (Formerly AMDS)	MIPR	OTC : Ft. Hood, TX	4.341	-		-		-		-		-	0.000	4.341	-
SREHD (Formerly AMDS)	MIPR	ARL : Adelphi, MD	0.100	-		-		-		-		-	0.000	0.100	-
		Subtotal	18.178	-		-		-		-		-	0.000	18.178	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	144.716	0.100		-		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 415 / *Mine Neutral/Detection*

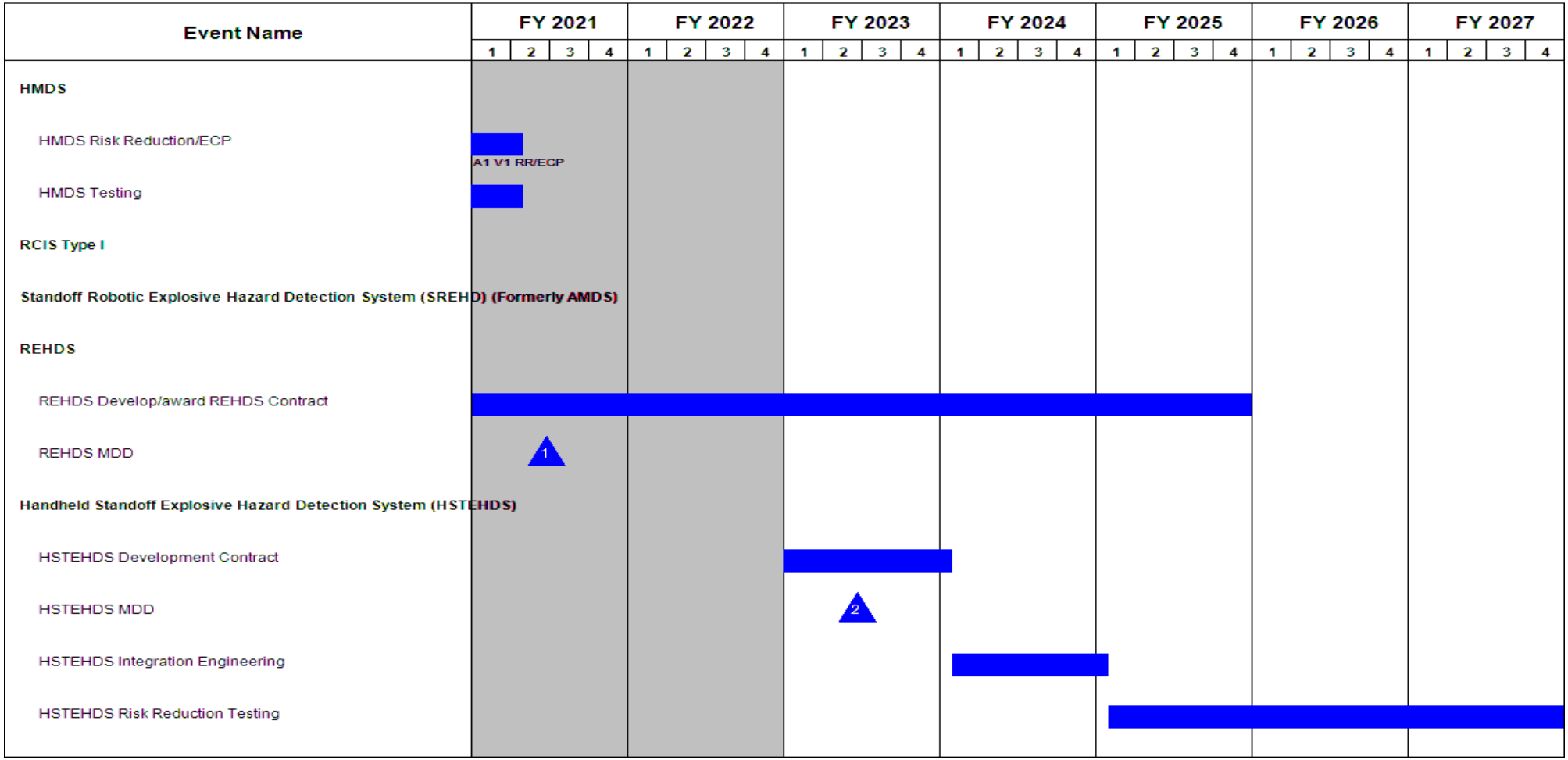

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 415 / *Mine Neutral/Detection*

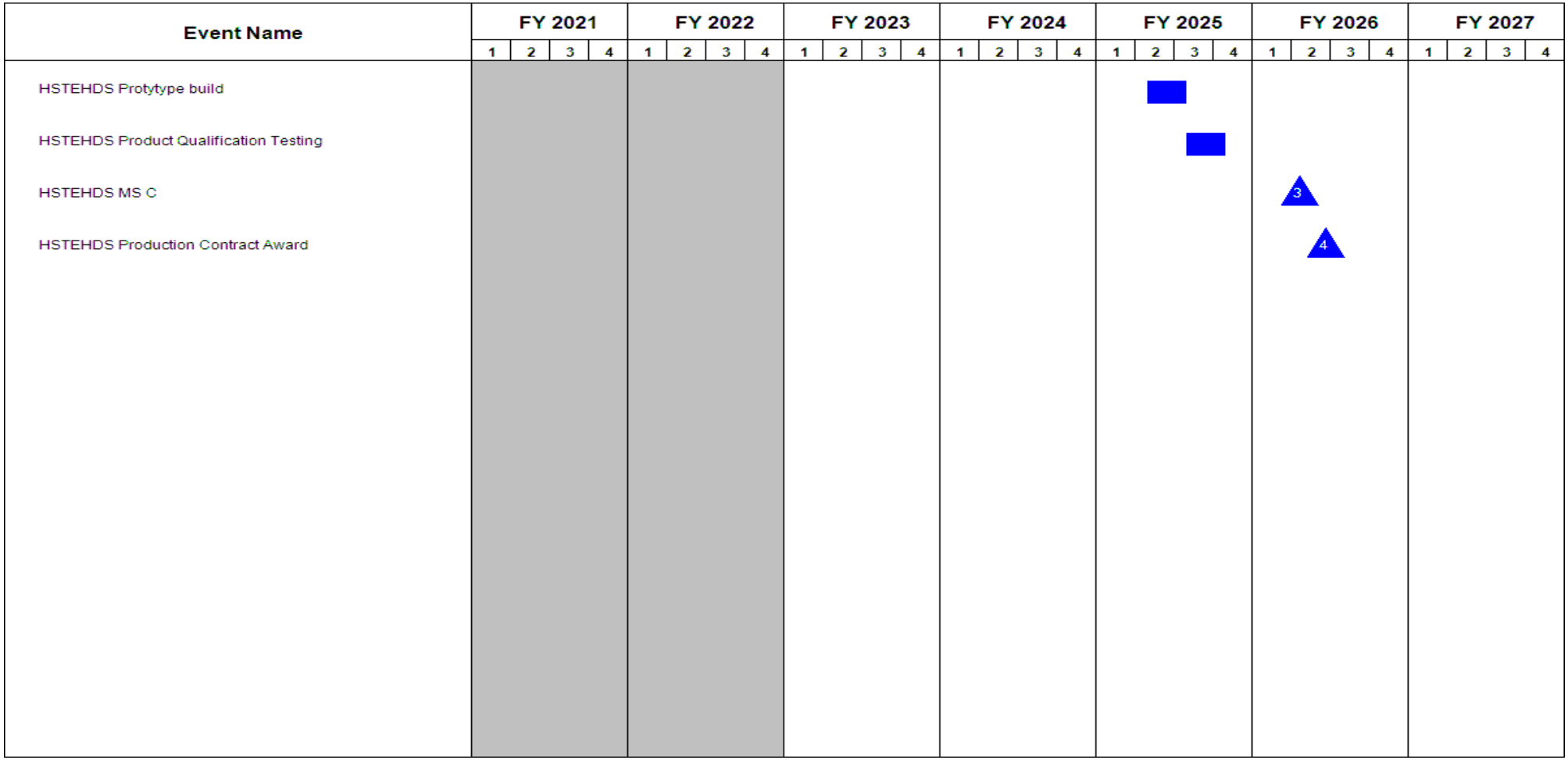

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 415 / *Mine Neutral/Detection*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
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

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** 415 / *Mine Neutral/Detection*

	Start		End	
Events	**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 Protytype 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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
CS2: *Render Safe Sets Kits and Outfits (RS-SKO)*	-	-	0.916	1.026	-	1.026	1.030	1.977	1.977	1.997	0.000	8.923
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project 016 / Close Combat Capabilities - Eng Dev within Program Element (PE) 0604808A / Landmine Warfare/Barrier - Eng Dev restructures to Project CS2 / Render Safe Sets Kits and Outfits (RS-SKO) within Program Element (PE) 0604808A / Landmine Warfare/Barrier - Eng Dev in Fiscal Year (FY) 2022.

A. Mission Description and Budget Item Justification

Project CS2: 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 in multi-domain operations (MDO). Technical refresh of capabilities ensures AimPoint formations maintain overmatch capability. EOD RS-SKO equips EOD teams with low light visual augmentation system, electronic countermeasures, subsurface explosive and hazard 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 among information reporting and control systems. FY 2023 request will support the build of production representative systems and their technical evaluation. FY 2023 request will also support the first phase of technical refresh of RS SKO capabilities to ensure AimPoint formations maintain overmatch capability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Explosive Ordnance Disposal (EOD) Render Safe (RS)	-	0.883	1.026
FY 2022 Plans: FY 2022 funding will support the build of the final Electronic Countermeasure (ECM) design prototypes and the testing of the final prototypes against requirements.			
FY 2023 Plans: FY 2023 funding will support the build of production representative systems and their technical evaluation. FY 2023 funding will also support the first phase of technical refresh of RS SKO capabilities to ensure AimPoint formations maintain overmatch capability.			
FY 2022 to FY 2023 Increase/Decrease Statement: Increase in funding for FY 2023 reflects combination of Projects 016 and CS2.			
Title: FY22 SBIR/STTR	-	0.033	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: Funding transferred in accordance with Title 15 USC ?638 ***FY 2022 Plans:*** FY22 Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY22 Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)			
Accomplishments/Planned Programs Subtotals	-	0.916	1.026

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• 016: *Close Combat Capabilities ENG DEV*	9.139	26.174	10.000	-	10.000	10.000	10.000	10.000	-	0.000	75.313
• R63701: *Render Safe Sets Kits Outfits*	145.313	84.000	0.000	-	0.000	-	5.078	2.277	2.277	Continuing	Continuing

Remarks

FY 2022 funding for Render Safe Sets Kits and Outfits (RS-SKO) in Project 016: Close Combat Capabilities ENG DEV was $0.074M.

D. Acquisition Strategy

The Explosive Ordnance Disposal (EOD) Render Safe (RS) program utilizes existing government contract vehicles to acquire Electronic Countermeasure (ECM) 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY22 SBIR/STTR	TBD	TBD : TBD	-	-		0.033		-		-		-	0.000	0.033	-
		Subtotal	-	-		0.033		-		-		-	0.000	0.033	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EOD RS - Engineering Support	MIPR	DEVCOM C5ISR Center : Aberdeen Proving Ground (APG), MD	-	-		0.690	May 2022	0.806	Oct 2022	-		0.806	Continuing	Continuing	-
EOD-RS - Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		0.043	May 2022	0.070	Oct 2022	-		0.070	Continuing	Continuing	-
		Subtotal	-	-		0.733		0.876		-		0.876	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EOD- RS Test & Evaluation	MIPR	ATEC - Yuma Test Center : Yuma, AZ	-	-		0.150	Jul 2022	0.150	Jul 2023	-		0.150	Continuing	Continuing	-
		Subtotal	-	-		0.150		0.150		-		0.150	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.916		1.026		-		1.026	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

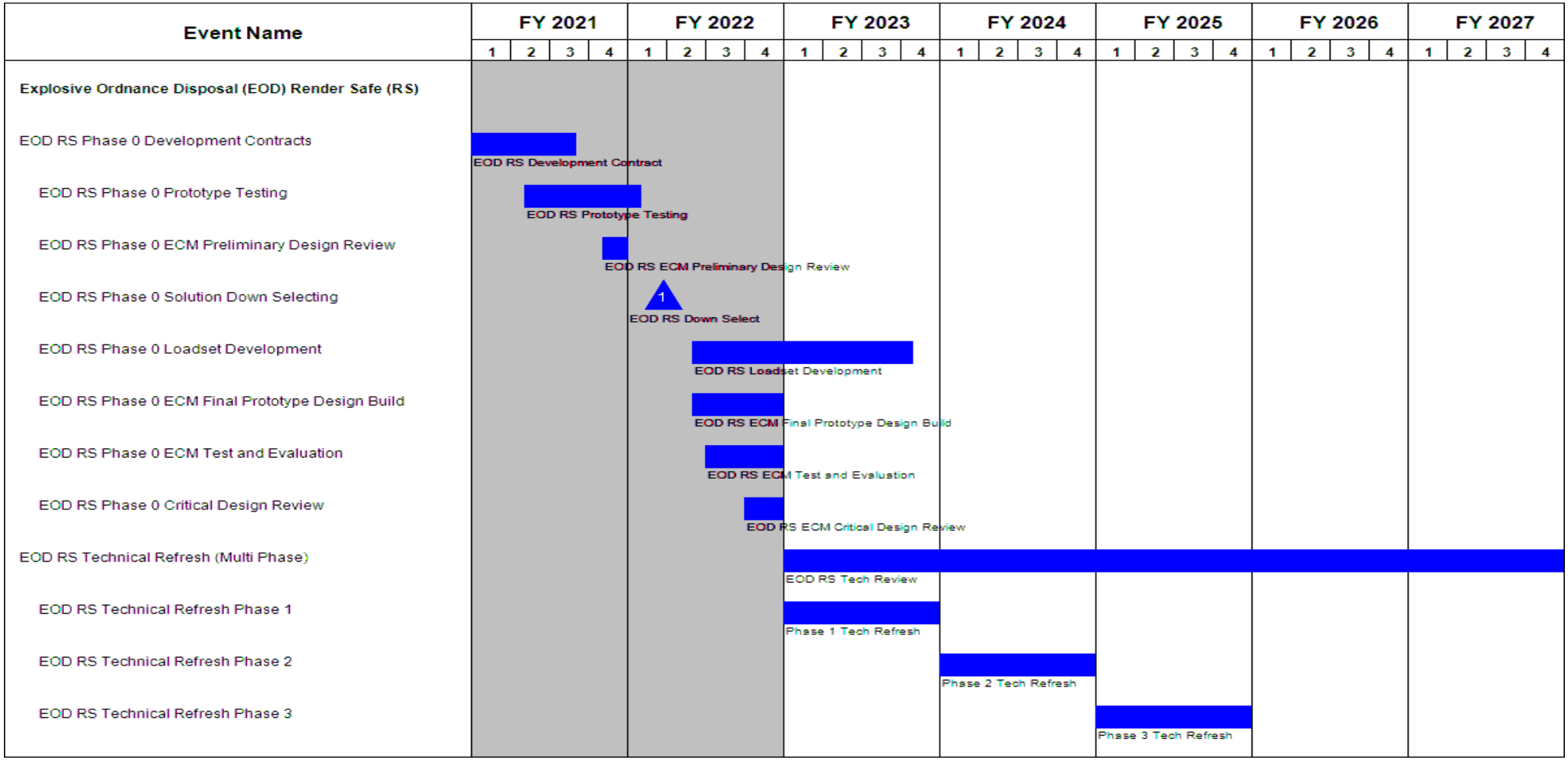

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

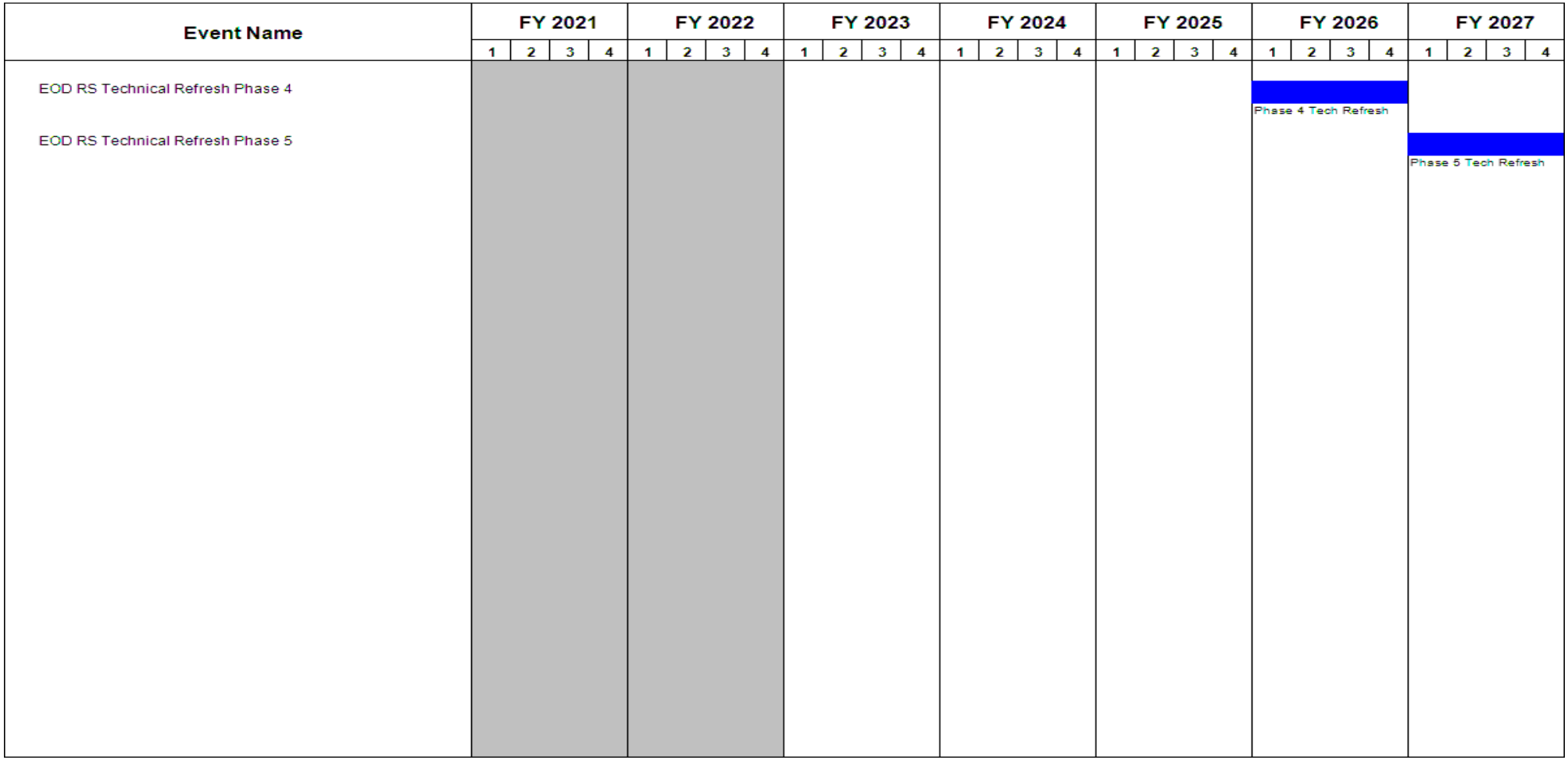

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS2 / *Render Safe Sets Kits and Outfits (RS-SKO)*

Schedule Details

	Start		End	
Events	**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	1	2022
EOD RS Phase 0 ECM Preliminary Design Review	4	2021	4	2021
EOD RS Phase 0 Solution Down Selecting	1	2022	1	2022
EOD RS Phase 0 Loadset Development	2	2022	4	2023
EOD RS Phase 0 ECM Final Prototype Design Build	2	2022	4	2022
EOD RS Phase 0 ECM Test and Evaluation	3	2022	4	2022
EOD RS Phase 0 Critical Design Review	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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS3 / *Next Generation Advanced Bomb Suit (NGABS)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
CS3: *Next Generation Advanced Bomb Suit (NGABS)*	-	-	2.047	1.124	-	1.124	1.443	-	-	-	0.000	4.614
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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Next Generation Advanced Bomb Suit (NGABS)	-	1.972	1.124
Description: 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.			
FY 2022 Plans: 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.			
FY 2023 Plans: During FY23, the NGABS program will accomplish Pre-Planned Product Improvements (PPPI) that will focus on improving situational awareness and cooling system improvements that can be on-ramped onto the NGABS production contract. The TRADOC Proponent Office ? Explosive Ordnance Disposal (TPO-EOD) has already identified the daylight camera, adding USB/			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS3 / *Next Generation Advanced Bomb Suit (NGABS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
HDMI port, smaller and higher resolution sensors, and the cooling system as candidates for the NGABS program to upgrade and improve capabilities. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The decrease in funding from FY22 to FY23 is due to the end of the NGABS Other Transaction Authority (OTA) contract with the delivery of the final four milestones and transitioning to the PPPI in FY23.			
Title: SBIR/STTR ***FY 2022 Plans:*** Funding transferred in accordance with Title 15 USC 638 ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC 638	-	0.075	-
Accomplishments/Planned Programs Subtotals	-	2.047	1.124

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS3 / *Next Generation Advanced Bomb Suit (NGABS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS	Allot	PdM SPE : Fort Belvoir	-	-		0.338		-		-		-	0.000	0.338	Continuing
Program Management Support	Allot	PdM SPE : Fort Belvoir	-	-		-		0.297		-		0.297	0.000	0.297	Continuing
SBIR/STTR	TBD	Various : Various	-	-		0.075		-		-		-	Continuing	Continuing	Continuing
		Subtotal	-	-		0.413		0.297		-		0.297	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total 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		0.684		-		0.684	0.000	1.693	Continuing
		Subtotal	-	-		1.009		0.684		-		0.684	0.000	1.693	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Support Costs	MIPR	TBD : Various	-	-		0.467		-		-		-	0.000	0.467	Continuing
		Subtotal	-	-		0.467		-		-		-	0.000	0.467	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NGABS Test & Evaluation	Allot	TBD : Various	-	-		0.158		0.143		-		0.143	0.000	0.301	Continuing
		Subtotal	-	-		0.158		0.143		-		0.143	0.000	0.301	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	Project (Number/Name) CS3 / *Next Generation Advanced Bomb Suit (NGABS)*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		2.047		1.124		-		1.124	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS3 / *Next Generation Advanced Bomb Suit (NGABS)*

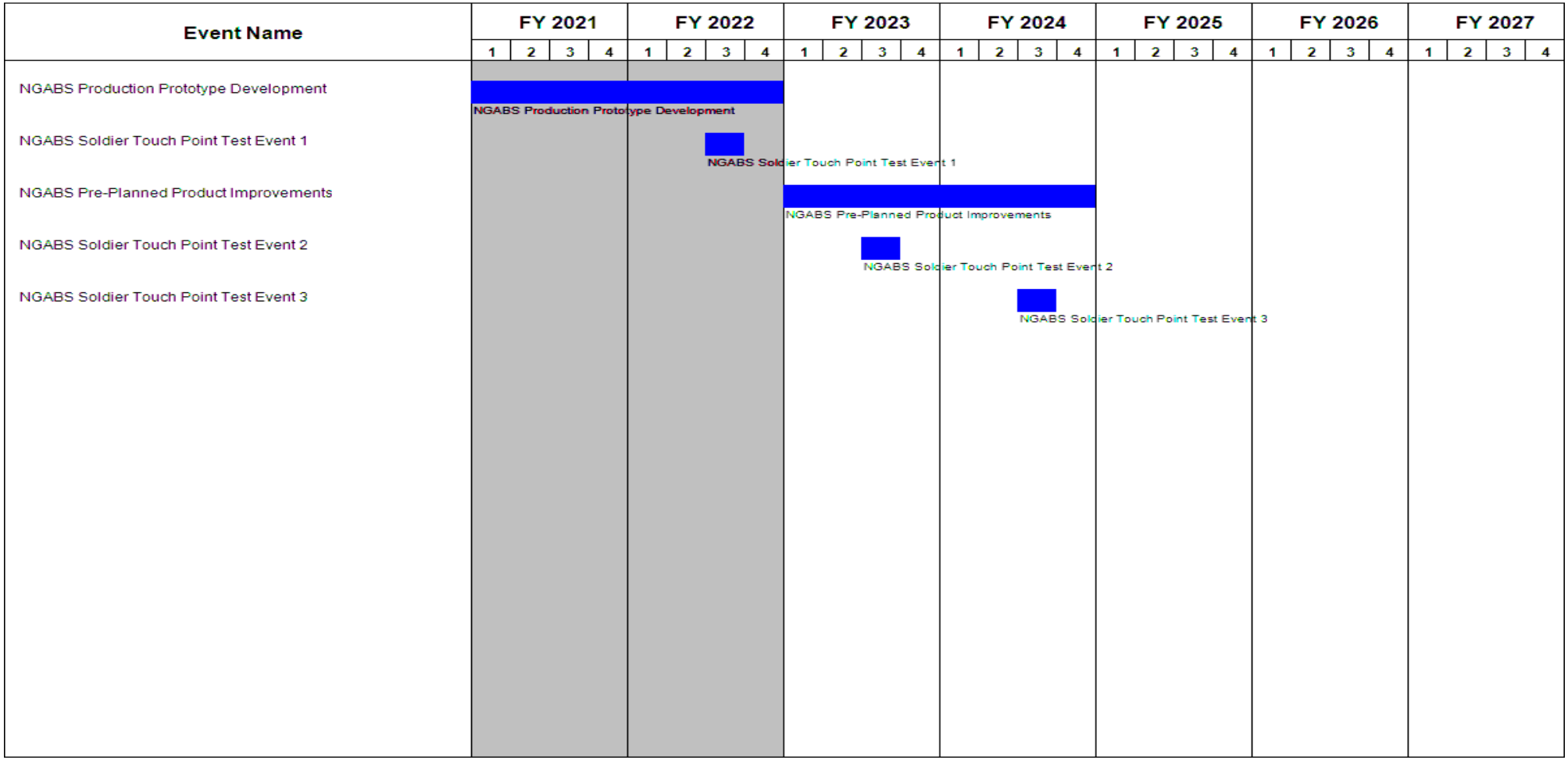

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604808A / *Landmine Warfare/Barrier - Eng Dev*	**Project (Number/Name)** CS3 / *Next Generation Advanced Bomb Suit (NGABS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
NGABS Production Prototype Development	4	2019	4	2022
NGABS Soldier Touch Point Test Event 1	3	2022	3	2022
NGABS Pre-Planned Product Improvements	1	2023	4	2024
NGABS Soldier Touch Point Test Event 2	3	2023	3	2023
NGABS Soldier Touch Point Test Event 3	3	2024	3	2024