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 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0607131A *I Weapons and Munitions Product Improvement Programs*							
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	-	24.666	35.828	11.674	-	11.674	4.952	2.288	2.288	2.311	Continuing	Continuing
CP2: *Precision Fire Technology Improvements*	-	-	8.210	-	-	-	-	-	-	-	0.000	8.210
ER2: *Close Combat Technology*	-	6.518	3.468	2.807	-	2.807	0.684	-	-	-	Continuing	Continuing
ER5: *Indirect Fire and Fuze Technology*	-	4.712	4.463	2.454	-	2.454	2.215	2.288	2.288	2.311	Continuing	Continuing
ER6: *Direct Fire Technology*	-	13.436	19.687	6.413	-	6.413	2.053	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Project CP2 Precision Fire Technology Improvements supports required Precision Munitions and Fuze assessment and improvement initiatives to support increased rates of fire for items that have been fielded or in full rate production, such as the M1155 Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS), Excalibur and Precision Guidance Kit (PGK). Efforts will identify, characterize, study, analyze, test and develop Precision Munition and Fuze technologies to increase range, lethality, effectiveness, survivability and accuracy. This Project does not have a Fiscal Year (FY) 2023 budget request.

Project ER2 Close Combat Technology includes development efforts to upgrade Close Combat technologies, energetics, and munitions, such as counter explosives, grenades, demolitions, shoulder launched munitions, pyrotechnic simulators, countermeasure flares, non-lethal ammunition/systems, and networked munitions and mines, that have been fielded or have received approval for full rate production. FY 2023 funding will allow the project to identify, characterize, study, analyze, test and develop technologies to resolve close combat munition reliability, safety, environmental, storage, standardization, obsolescence and manufacturing/producibility issues.

Project ER5 The Indirect Fire and Fuze Technology Project includes product improvement development efforts to upgrade indirect fire weapon systems and munitions that have already been fielded and/or are in production. Initiatives include improved target engagement, increased reliability, availability, maintainability, and safety, standardization and interoperability with weapons and munitions of Allied Nations, defense exportability features, reduction of failure mechanisms, and supply chain risk through introduction of new and alternative technology and materiel solutions, improvement of manufacturing methods and their associated production and life cycle support processes, new capabilities in response to the evolving and emerging threats and countermeasures, and reduction/elimination of potential environmental and health risks associated with these products. Fiscal Year (FY) 2023 funding will support Fuze Technology Integration (FTI) efforts to complete conventional artillery fuze evaluations for compatibility with Long Range Precision Fire (LRPF) projectiles; expand and refine the fuze critical components database to identify and mitigate obsolescence and single point components & processes; and develop and evaluate M734A1 mortar fuze custom application specific integrated circuit (ASIC) signal processor and accelerometer; complete implementing the M739A1/M782 artillery fuze setback mass drop safety improvement; continue integrating electronic and energetic technologies into the M213 hand grenade fuze to increase fuze and explosive safety; continue maturing extended duration artillery fuze power sources; support M783 mortar fuze evaluation, design improvement and testing to preclude early fuze functioning; and evaluate miniature reserve cell batteries for use in 30mm to 40mm medium caliber fuzes.

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 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0607131A *I Weapons and Munitions Product Improvement Programs*

Project ER6: The Direct Fire Technology funding will be used to support direct fire ammunition from small caliber ammunition, medium caliber ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements. Fiscal Year (FY) 2023 funding supports a number of small caliber ammunition projects including improvements to training ammunition; improvements to make small caliber primers more environmentally friendly; optimization of handgun ammunition; exploring precision sniper improvements and continuing the effort to reduce Soldier load by developing lightweight ammunition. Improvements to medium caliber ammunition include lethality and safety enhancements on 40mm ammunition. Improvements to 105mm and 120mm tank ammunition include examination and implementation of performance enhancement and improvements to tracer, combustible cartridge case and 105mm Advanced Multipurpose (AMP).

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	19.666	22.828	0.000	-	0.000
Current President's Budget	24.666	35.828	11.674	-	11.674
Total Adjustments	5.000	13.000	11.674	-	11.674
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	13.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	5.000	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	11.674	-	11.674

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: ER6: *Direct Fire Technology*		
Congressional Add: *Tungsten Manufacturing Affordability Initiative for Armaments*	-	8.000
Congressional Add: *Printed Electronics (PEEMS)*	-	5.000
Congressional Add Subtotals for Project: ER6	-	13.000
Congressional Add Totals for all Projects	-	13.000

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 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) CP2 / *Precision Fire Technology Improvements*	

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
CP2: *Precision Fire Technology Improvements*	-	-	8.210	-	-	-	-	-	-	-	0.000	8.210
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project supports required Precision Munitions and Fuze assessment and improvement initiatives to support increased rates of fire for items that have been fielded or in full rate production, such as the M1155 Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS), Excalibur and Precision Guidance Kit (PGK). Efforts will identify, characterize, study, analyze, test and develop Precision Munition and Fuze technologies to increase range, lethality, effectiveness, survivability and accuracy. FY 2022 funding will support preliminary fuze setter trade studies and improvement activities on setter technologies to inform requirements and the setter modernization roadmap. FY 2022 funding will also support the Excalibur high pressure setback testing and safety margin improvement initiatives that will ensure survivability and reliability with the Extended Range Cannon Artillery (ERCA) system in support of the Army's modernization priorities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) Modernization	-	3.299	-
Description: The effort supports fuze setting system requirements based on legacy and developmental platforms and munitions for 155mm Artillery systems. Efforts support development of comprehensive technology plan for Increased Range and Increased Rate of Fire improvements related to the ERCA weapon system as well as other Artillery Modernization efforts. ***FY 2022 Plans:*** FY 2022 funding will support preliminary fuze setter trade studies and improvement activities on setter technologies to inform requirements and the setter modernization roadmap. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** This Project does not have a FY 2023 budget Request.			
Title: Excalibur Ib Modernization	-	4.611	-
Description: This effort will complete a series of Excalibur Ib safety and reliability test activities to ensure survivability at higher pressures in the ERCA system. ***FY 2022 Plans:*** FY 2022 funding will support the Excalibur high pressure setback testing and safety margin improvement initiatives that will ensure survivability and reliability with the ERCA system in support of the Army's modernization priorities. ***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 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** CP2 / *Precision Fire Technology Improvements*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
This Project does not have a FY 2023 budget Request.			
Title: FY 2022 SBIR/STTR Transfer	-	0.300	-
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			
Accomplishments/Planned Programs Subtotals	-	8.210	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The EPIAFS Modernization effort will utilize US Government labor and development capabilities to accomplish trade studies and Other Transaction Agreement (OTA) contracts for development of promising fuze setting concepts. Upon completion, efforts will transition to production as Engineering Change Proposals (ECPs) to be integrated into existing production contracts as they become available.

The Excalibur Ib Modernization effort will utilize existing Engineering Services contract with Raytheon Missiles and Defense as well as various Federal Acquisition Regulation (FAR) contracts to support modernization activities. Upon successful completion, improvements will be integrated via Engineering Change Proposal (ECP) in the Excalibur Ib production contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) CP2 / *Precision Fire Technology Improvements*	

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	-	-		0.300		-		-		-	0.000	0.300	-
		Subtotal	-	-		0.300		-		-		-	0.000	0.300	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
Excalibur Ib Modernization Component Hardware	Various	To Be Determined : TBD	-	-		0.286	Jan 2022	-		-		-	0.000	0.286	-
Excalibur Ib Modernization Hardware	SS/CPFF	Raytheon Missiles and Defense (RMD) : Tuscon, AZ	-	-		1.329	Apr 2022	-		-		-	0.000	1.329	-
EPIAFS Modernization Development and Hardware	Various	To Be Determined : TBD	-	-		1.179	Jun 2022	-		-		-	0.000	1.179	-
		Subtotal	-	-		2.794		-		-		-	0.000	2.794	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
Excalibur Ib Modernization Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		0.600	Nov 2021	-		-		-	0.000	0.600	-
EPIAFS Modernization Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center	-	-		1.720	Nov 2021	-		-		-	0.000	1.720	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) CP2 / *Precision Fire Technology Improvements*	

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													
EPIAFS Modernization Platform/Fire Control Integration Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		0.100	Nov 2021	-		-		-	0.000	0.100	-
EPIAFS Modernization Cybersecurity Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		0.100	Nov 2021	-		-		-	0.000	0.100	-
		Subtotal	-	-		2.520		-		-		-	0.000	2.520	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
Excalibur Ib High Pressure Setback Testing	MIPR	Army Test and Evaluation Command (ATEC), Yuma Proving Grounds : Yuma, AZ	-	-		0.525	May 2022	-		-		-	0.000	0.525	-
Excalibur Ib Safety Margin and Reliability Testing	MIPR	Army Test and Evaluation Command (ATEC), Yuma Proving Grounds : Yuma, AZ	-	-		1.871	Jun 2022	-		-		-	0.000	1.871	-
EPIAFS Modernization Environmental Testing	MIPR	Combat Capabilities Development Command Armaments Center	-	-		0.100	Aug 2022	-		-		-	0.000	0.100	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) CP2 / *Precision Fire Technology Improvements*	

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
		(DEVCOM AC) : Picatinny Arsenal, NJ													
EPIAFS Modernization Firing Testing	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	-		0.100	Aug 2022	-		-		-	0.000	0.100	-
		Subtotal	-	-		2.596		-		-		-	0.000	2.596	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	-	-		8.210		-		-		-	0.000	8.210	N/A

Remarks

EPIAFS = Enhanced Portable Inductive Artillery Fuze Setter

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** CP2 / *Precision Fire Technology Improvements*

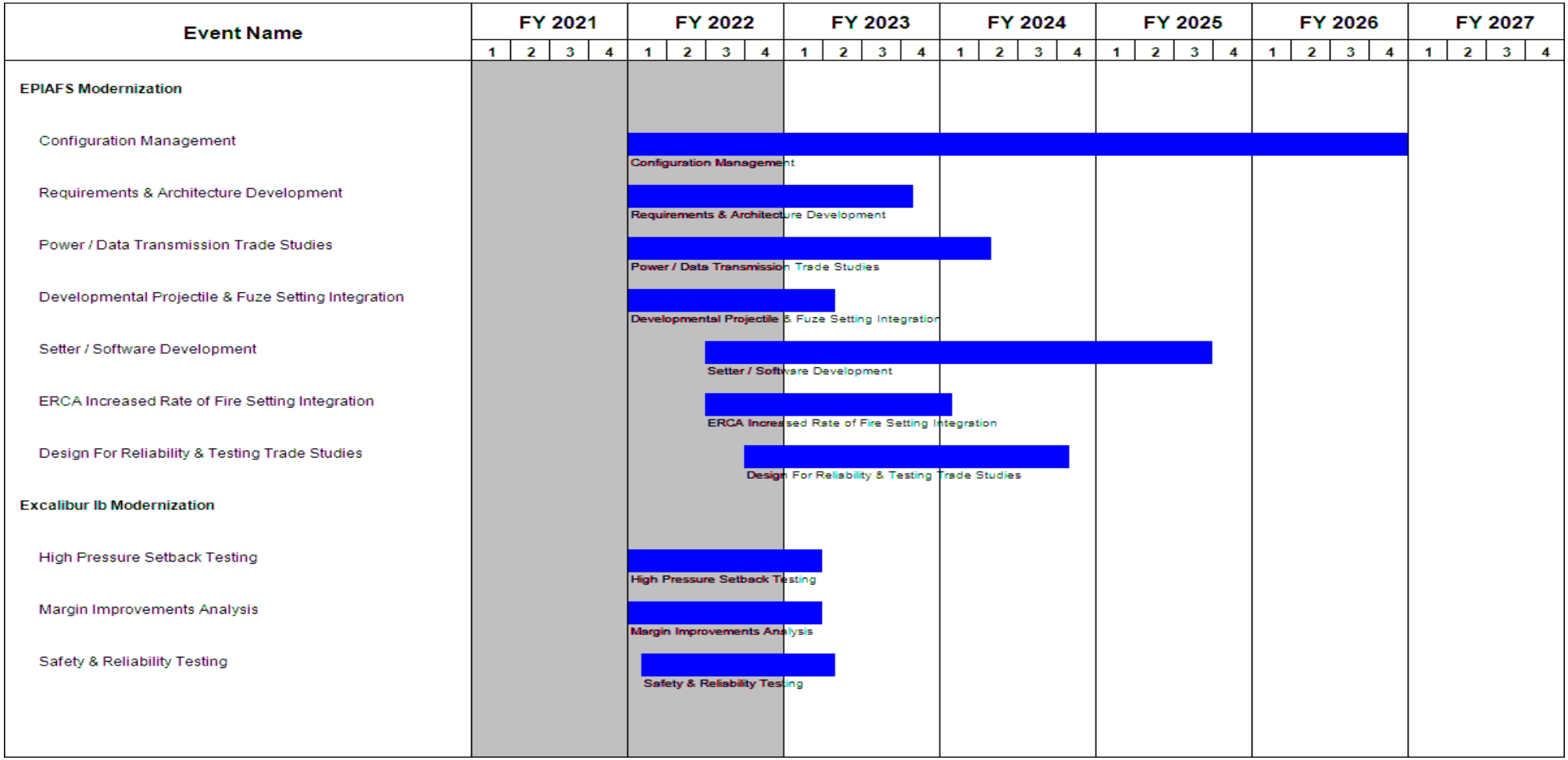

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** CP2 / *Precision Fire Technology Improvements*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
EPIAFS Modernization	1	2022	4	2026
Configuration Management	1	2022	4	2026
Requirements & Architecture Development	1	2022	4	2023
Power / Data Transmission Trade Studies	1	2022	2	2024
Developmental Projectile & Fuze Setting Integration	1	2022	2	2023
Setter / Software Development	3	2022	3	2025
ERCA Increased Rate of Fire Setting Integration	3	2022	1	2024
Design For Reliability & Testing Trade Studies	4	2022	4	2024
Excalibur Ib Modernization	1	2022	4	2022
High Pressure Setback Testing	1	2022	1	2023
Margin Improvements Analysis	1	2022	1	2023
Safety & Reliability Testing	1	2022	2	2023

Note

EPIAFS = Enhanced Portable Inductive Artillery Fuze Setter
ERCA = Extended Range Cannon Artillery

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER2 / *Close Combat Technology*	

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
ER2: *Close Combat Technology*	-	6.518	3.468	2.807	-	2.807	0.684	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project ER2 Close Combat Technology includes development efforts to upgrade Close Combat technologies, energetics, and munitions, such as counter explosives, grenades, demolitions, shoulder launched munitions, pyrotechnic simulators, countermeasure flares, non-lethal ammunition/systems, and networked munitions and mines, that have been fielded or have received approval for full rate production. FY 2023 funding will allow the project to identify, characterize, study, analyze, test and develop technologies to resolve close combat munition reliability, safety, environmental, storage, standardization, obsolescence and manufacturing/producibility issues.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: M67 (G881) Fragmentation Hand Grenade	2.993	1.319	1.600
Description: The M67 Hand Grenade uses the M213 fuze which does not meet Insensitive Munitions (IM) requirements. This program is a modernization effort that will replace the legacy M67 with a new IM compliant system which greatly increases the safety of the warfighter as it will make the M67 less susceptible to inadvertent detonation. This effort will evaluate potential IM compliant foreign fuze candidates as a replacement to the current M213 fuze and incorporate an IM compliant explosive fill. The new IM compliant fuze and explosive fill will be qualified for incorporation into the M67 design and the TDP will be updated. The M67 is an enabler for Soldier Lethality as it provides Soldiers with a highly effective capability that is easy to throw and can produce casualties to enemy combatants via a 15 meter fragmentation radius. This capability allows for increased lethality of dismounted Soldiers making the unit more efficient and lethal.			
FY 2022 Plans: FY 2022 funding will integrate the IM compliant fuze with the IM compliant fill and conduct engineering testing.			
FY 2023 Plans: FY 2023 will finalize the load, assemble, pack of qualification hardware in support of qualification testing for the M67 fragmentation grenade.			
FY 2022 to FY 2023 Increase/Decrease Statement: FY 2023 increase is due to the load, assemble, pack of qualification hardware.			
Title: M330 Obscuration Grenade	0.726	1.292	0.857
Description: The M330 is an improved obscurant grenade that provides the warfighter with screening performance equivalent to the legacy AN-M8 smoke grenade. The M330 will replace the toxic carcinogen fill used in the AN-M8 smoke grenade with a more environmentally friendly formulation. The legacy AN-M8 has been restricted to use in contingency operations only due to its toxic			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
effects. The M83 training smoke grenade currently used in lieu of the AN-M8 in both training and tactical operations does not give the screening performance comparable to the legacy AN-M8. Soldiers must also use three M83 grenades to produce obscuration effects comparable to a single AN-M8 grenade. The M330 will not only reduce the Soldier?s combat load but will also provide sufficient tactical obscuration compared to the M83 thereby increasing Soldier mobility and survivability during operations under enemy fire. ***FY 2022 Plans:*** FY 2022 funding will complete the prototype design, develop the Technical Data Package (TDP), start initial Engineering Change Proposal (ECP) process, procure Design Verification Testing (DVT) components, and complete the Qualification Plan for product release ECP. ***FY 2023 Plans:*** FY 2023 funding supports the completion of the hardware build and material procurement for Design Verification Testing (DVT) and will complete the TDP. FY 2023 supports the final release of the ECP allowing the M330 to enter production. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease is due to the reduction of design and developmental efforts to support planned testing events.			
Title: M112 Demolition Block ? Alternate Fill ***Description:*** This effort will qualify an alternative explosive fill (PAX-52) for the M112 demolition block. The alternate fill provides a more reliable demolition for use in cold and extreme cold conditions. It also eliminates the need for Polyisobutylene (PIB) a current single point failure within the production of the M112 Demolition Block. ***FY 2022 Plans:*** FY 2022 will fund Modified Energy Output and Penetrometer Testing over temperature extremes and a pilot run of 2,000 pounds of PAX-52 to be lapped into 1,500 blocks to support Insensitive Munitions (IM) and Material Release (MR) testing. ***FY 2023 Plans:*** FY 2023 funding supports the execution of Design Verification Testing (DVT) and Insensitive Munitions (IM) tests. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decrease is due to materials needed for testing being procured in FY 2022.	0.456	0.400	0.250
Title: Airborne Expendable Countermeasure Modernization ***Description:*** Combine legacy countermeasures into single cartridge to optimize Size, Weight, and Power (SWAP) and increase number of countermeasure solutions.	-	-	0.100

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 Plans: FY 2023 will support modeling and simulation countermeasure improvements and produce initial prototypes for future testing. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 increase needed to begin the modernization of legacy countermeasure capabilities.			
Title: Volcano Countermeasure Testing ***Description:*** The Family of Scatterable Mines (FASCAM)/Volcano use electronic sensors to detect vehicles and engage them. New foreign and domestic electronic counter-measure systems have been developed which may breach a field at a much higher speed than legacy mechanical breachers. This testing will assess the speed and range of electronic breaching Volcano. The program will also characterize newer electronic munition sensors for their ability to resist these new defeat systems.	0.250	-	-
Title: M18 Smoke Grenade Dye ***Description:*** Smoke Grenade Dyes are a key component of the M18 Color Smoke Hand Grenades (Green, Yellow, Red, Violet) and are among items at risk for future production. The M18 Smoke Grenade is an enabler to Soldier Lethality as it provides the Warfighter with a multi-functional capability that provides both effective marking and screening allowing the Unit to be more efficient and effective in combat operations. The anthraquinone-based intermediates necessary for dye production are foreign-sourced (non- National Technology and Industrial Base (NTIB)) and there are no alternative dye formulations identified to date. This effort seeks to prove out a pilot-scale process to synthesize the necessary intermediates that could lead to a dye producer within the NTIB. This will increase availability dyes necessary for production thereby increasing readiness for the warfighter. ***FY 2022 Plans:*** FY 2022 funding will build and prove out the prototype pilot scale process. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The M18 Smoke Grenade Dye effort will be completed in FY 2022.	0.200	0.048	-
Title: M111 Offensive Hand Grenade - Alternative Explosive Fill ***Description:*** This effort will qualify an alternative explosive fill for the M111 Offensive Hand Grenade, which replaces the MK3A2 Offensive Hand Grenade due to asbestos concerns with the legacy grenade. The alternate fill will mitigate availability risk of the current M111 fill, PAX-3, which is a single point failure within the production of the M111 Offensive Hand Grenade. The M111 is an enabler for soldier lethality as it provides Soldiers a capability to produce blast overpressure effects against enemy troops in indoor areas, bunkers, trench lines and tunnels. This capability allows for increased lethality of dismounted Soldiers making the unit more efficient and lethal.	1.448	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: M82 Simulant Smoke Practice Grenade ***Description:*** This effort is to address performance issues with the current M82 design. The M82 Simulant Smoke Grenade is a 66mm grenade fielded to train in the handling, usage and deployment of the M76 infra-red, M81 graphite and brass flake and L8 Red Phosphorus grenades. This effort will modernize the M82 and will eliminate the end item reliability issues experienced by the legacy design. The improvement to the design will provide the soldier with a reliable training device thus increasing Soldier readiness. ***FY 2022 Plans:*** FY 2022 funding will complete the redesign of the M82 components, complete the TDP, and implement the ECP. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The M82 Simulant Smoke Practice Grenade effort will be completed in FY 2022.	0.445	0.282	-
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	-	0.127	-
Accomplishments/Planned Programs Subtotals	6.518	3.468	2.807

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
• E33010: *GRENADE, HAND OFFENSIVE, M111*	5.694	6.218	9.593	-	9.593	20.764	11.475	0.674	0.674	0.000	55.092
• E32000: *GRENADE, Hand, Frag, Delay, M67*	3.536	3.358	5.005	-	5.005	12.219	2.804	8.571	8.566	0.000	44.059

Remarks

D. Acquisition Strategy

The strategy for the legacy M67 Fragmentation Hand Grenade is to replace the legacy M67 with a new IM compliant system which greatly increases the safety of the warfighter as it will make the M67 less susceptible to inadvertent detonation. This involves integrating an IM compliant fuze along with an IM compliant explosive fill into

the M67 offensive hand grenade. The new design will be tested and qualified in order to mitigate the insensitive munition hazards associated with the explosive fill and the fuze technology. Follow-on procurement efforts will be competitive pending market research.

The strategy for the M330 is to qualify an alternative fill as the legacy AN-M8 grenade is restricted for use in contingency operations only due to its toxicity. Development of the M330 will ensure the Warfighter has tactical smoke obscuration that is environmentally friendly. Once the smoke fill is qualified, the plan is to conduct design verification tests, system qualification testing, implement final design into technical data package, and prepare for production.

The strategy for the M68 MICLIC Trainer Improvement effort is to identify or design a trainer concept, leverage modeling and simulation, and build prototypes to be used for qualification testing ahead of a production decision.

The strategy for Volcano characterization is to test the speed and range of current Volcano electronic sensors using government testing facilities to inform future countermeasure development.

The strategy for the M18 Smoke Grenade is to prove out a pilot-scale process to synthesize the necessary intermediates that could lead to a producer within the NTIB thus eliminating a foreign, single point source for smoke grenade production. The program will utilize an Other Transaction Authority (OTA) acquisition vehicle to demonstrate a novel, prototype method of colored smoke dye production.

The strategy for the M111 is to qualify an alternate explosive fill for the M111 Offensive Hand Grenade, which replaces the MK3A2 Offensive Hand Grenade. The alternate fill solution mitigates availability risk of PAX-3, which is a single point failure within the production of the M111 Offensive Hand Grenade. The alternate fill, once qualified, will be implemented into the Grenade Consolidation Contract via an Engineering Change Proposal (ECP).

The M82 program is modernizing the design of specific parts to address reliability issues and to make it more producible. The new design will be validated through testing. The Technical Data Package (TDP) will be updated to implement the changes. The program will utilize an Other Transaction Authority (OTA) contract to demonstrate the design improvements.

The strategy for the Airborne Expendable Countermeasure Modernization is to use Other Transaction Authority (OTA) to produce test samples for flight testing and verification testing.

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	-	-		0.127		-		-		-	0.000	0.127	Continuing
		Subtotal	-	-		0.127		-		-		-	0.000	0.127	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
M67 Fragmentation Fuze Prototype	C/CPIF	IMI Systems : Israel	-	0.194	Jun 2021	-		0.650	Dec 2022	-		0.650	0.000	0.844	-
M67 Load Assemble and Pack (LAP)	C/FFP	Battelle Memorial Institute : Columbus, OH	-	0.242	Mar 2022	-		0.315	Jan 2023	-		0.315	0.000	0.557	-
M330 Enhanced Obscuration Grenade	MIPR	Pine Bluff Arsenal : White Hall, AR	0.190	-		0.233	Apr 2022	0.400	Jul 2023	-		0.400	0.000	0.823	-
M112 Demolition Block - Alternate Fill Effort Materials	C/FFP	TBD : TBD	-	-		0.250	Jun 2022	0.035	Oct 2022	-		0.035	0.000	0.285	-
M67 (G881) Fragmentation Hand Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.401	Apr 2021	-		-		-		-	0.000	0.401	-
M67 TDP Review & Testing Packaging Materials	MIPR	SAVIT Corporation : Rockaway, NJ	-	0.051	Feb 2021	-		-		-		-	0.000	0.051	-
M18 Smoke Grenade	C/FFP	Leidos Inc : Reston, VA	-	0.170	Apr 2021	0.021	May 2022	-		-		-	0.000	0.191	-
M111, Offensive Hand Grenade	C/FFP	Battelle Memorial Institute : Columbus, OH	1.135	0.147	Feb 2021	-		-		-		-	0.000	1.282	-
M112 Demolition Block - Alternate Fill Effort Materials	C/IDIQ	Joint Munitions Command : ROCK ISLAND,IL	-	0.056	Oct 2021	-		-		-		-	0.000	0.056	-

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
M67 Fragmentation Grenade	C/FFP	Battelle Memorial Institute : Columbus, OH	0.347	-		-		-		-		-	0.000	0.347	-
M330 Enhanced Obscuration Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.265	-		-		-		-		-	0.000	0.265	-
M82 Simulant Smoke Practice Grenade	MIPR	Pine Bluff Arsenal : White Hall, AR	0.316	-		-		-		-		-	0.000	0.316	-
		Subtotal	2.253	1.261		0.504		1.400		-		1.400	0.000	5.418	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
M67 (G881) Fragmentation Hand Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.725	Feb 2021	0.601	Apr 2022	0.635	Oct 2022	-		0.635	Continuing	Continuing	-
M330 Enhanced Obscuration Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.394	0.615	Nov 2020	0.720	Apr 2022	0.348	Nov 2022	-		0.348	Continuing	Continuing	-
M330 Enhanced Obscuration Grenade	MIPR	DEVCOM Chemical Biological Center : Edgewood, MD	1.371	0.045	Feb 2022	0.339	Apr 2022	0.109	Jan 2023	-		0.109	0.850	2.714	-
Countermeasure Modernization	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.050	Oct 2022	-		0.050	0.000	0.050	-
M111, Offensive Hand Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	3.638	0.553	Mar 2021	-		-		-		-	0.182	4.373	-
M82 Simulant Smoke Practice Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal. NJ	0.265	0.245	Mar 2021	0.142	Apr 2022	-		-		-	0.000	0.652	-

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
M18 Smoke Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal. NJ	-	0.030	Mar 2021	0.027	Apr 2022	-		-		-	0.000	0.057	-
M112 Demolition Block - Alternate Fill	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.400	Nov 2021	-		-		-		-	0.000	0.400	-
M67 (G881) Fragmentation Hand Grenade Support Contractor	C/FFP	BAH : Aberdeen Proving Grounds, MD	-	0.241	Jun 2021	-		-		-		-	0.000	0.241	-
M67 Fragmentation Hand Grenade Shipping	Allot	Shipping : Picatinny Arsenal, NJ	-	0.003	Nov 2021	-		-		-		-	0.000	0.003	-
M111, Offensive Hand Grenade	MIPR	Letterkenny Army Depot : Chambersburg, PA	0.039	-		-		-		-		-	0.000	0.039	-
M111, Offensive Hand Grenade Demil	MIPR	Tooele Army Depot : Tooele, UT	0.070	-		-		-		-		-	0.000	0.070	-
M111, Offensive Hand Grenade Shipping	Allot	Shipping : Picatinny Arsenal, NJ	0.009	-		-		-		-		-	0.000	0.009	-
M82 Simulant Smoke Practice Grenade	MIPR	DEVCOM Chemical Biological Center : Edgewood, MD	0.095	-		-		-		-		-	0.000	0.095	-
		Subtotal	5.881	2.857		1.829		1.142		-		1.142	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
Countermeasure Modernization M&S	MIPR	TBD : TBD	-	-		-		0.050	Feb 2023	-		0.050	0.000	0.050	-
M112 Demolition Block - Alternate Fill Design Insensitive Munitions Testing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.125	Nov 2022	-		0.125	0.000	0.125	-

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
M112 Demolition Block - Alternate Fill Design Verification Testing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		-		0.090	Oct 2022	-		0.090	0.000	0.090	-
Volcano Countermeasure Testing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.250	Dec 2020	-		-		-		-	0.000	0.250	-
M67 Arena & E3 Testing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.256	Jan 2022	-		-		-		-	0.000	0.256	-
M67 Engineering Testing	MIPR	Aberdeen Test Center : Aberdeen Proving Grounds, MD	-	0.503	Oct 2021	0.718	Apr 2022	-		-		-	0.000	1.221	-
M67 E3 Testing	MIPR	Redstone Test Center : Redstone Arsenal, AL	-	0.185	Jan 2022	-		-		-		-	0.000	0.185	-
M67 Grenade IM Testing	C/FFP	NTS : Camden, AR	-	0.192	Mar 2022	-		-		-		-	0.000	0.192	-
M111, Offensive Hand Grenade	MIPR	Yuma Test Center : Yuma Proving Grounds, AZ	-	0.230	Sep 2021	-		-		-		-	0.000	0.230	-
M111, Offensive Hand Grenade	MIPR	Aberdeen Test Center : Aberdeen Proving Grounds, NJ	0.351	0.518	Jul 2021	-		-		-		-	0.000	0.869	-
M82 Simulant Smoke Practice Grenade	MIPR	Pine Bluff Arsenal : White Hall, AR	0.495	0.200	Aug 2021	0.140	Mar 2022	-		-		-	0.000	0.835	-
M330 Enhanced Obscuration Grenade demonstration testing	MIPR	Pine Bluff Arsenal : White Hall, AR	-	0.066	Sep 2021	-		-		-		-	0.000	0.066	-
M111, Offensive Hand Grenade	MIPR	Redstone Test Center : Redstone Arsenal, AL	0.037	-		-		-		-		-	0.000	0.037	-
M112 Demolition Block - Alternate Fill Penetrometer	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		0.150	Apr 2022	-		-		-	0.000	0.150	-

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
& Modified Energy Output Testing															
		Subtotal	0.883	2.400		1.008		0.265		-		0.265	0.000	4.556	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	9.017	6.518		3.468		2.807		-		2.807	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

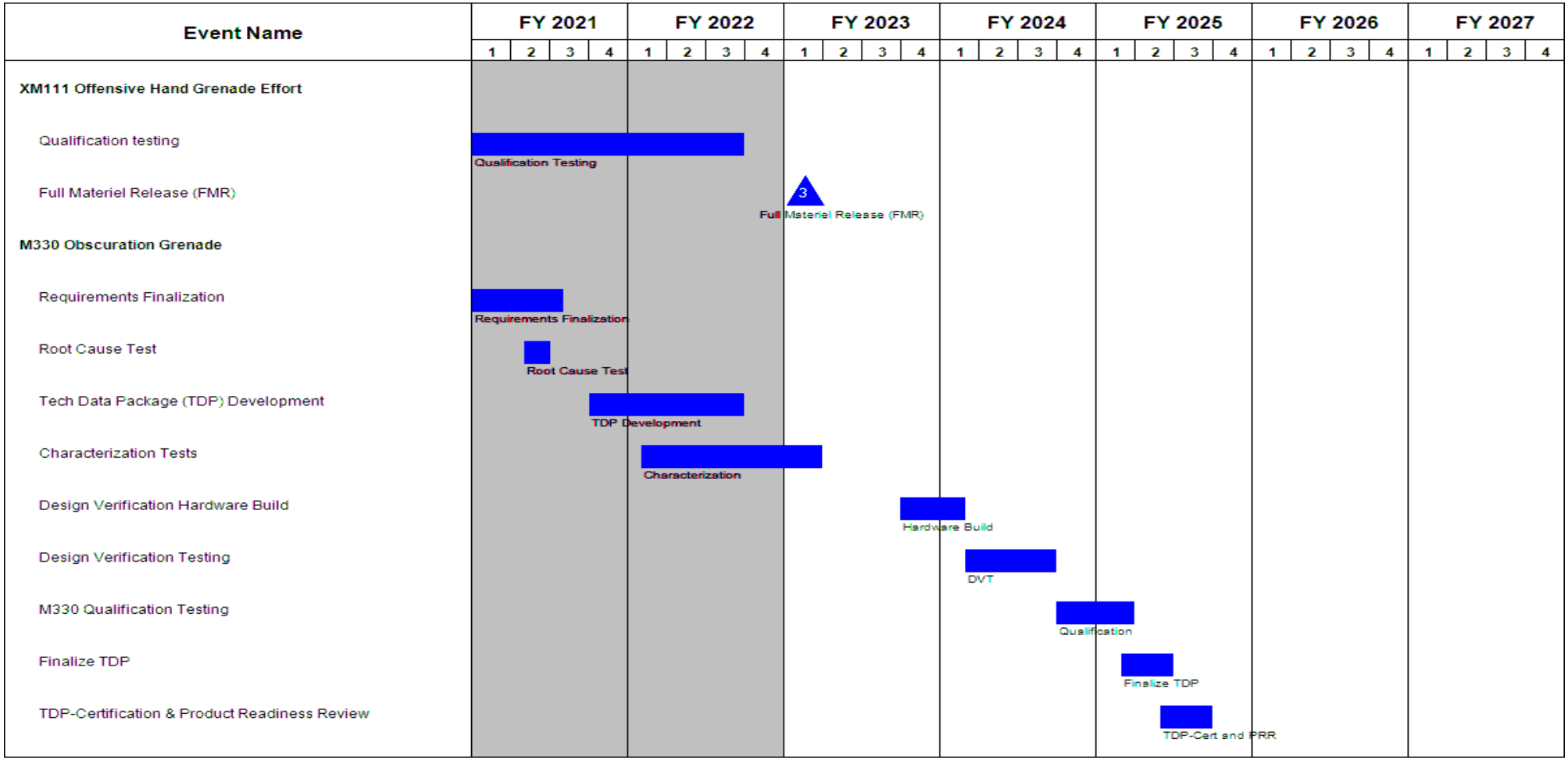

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

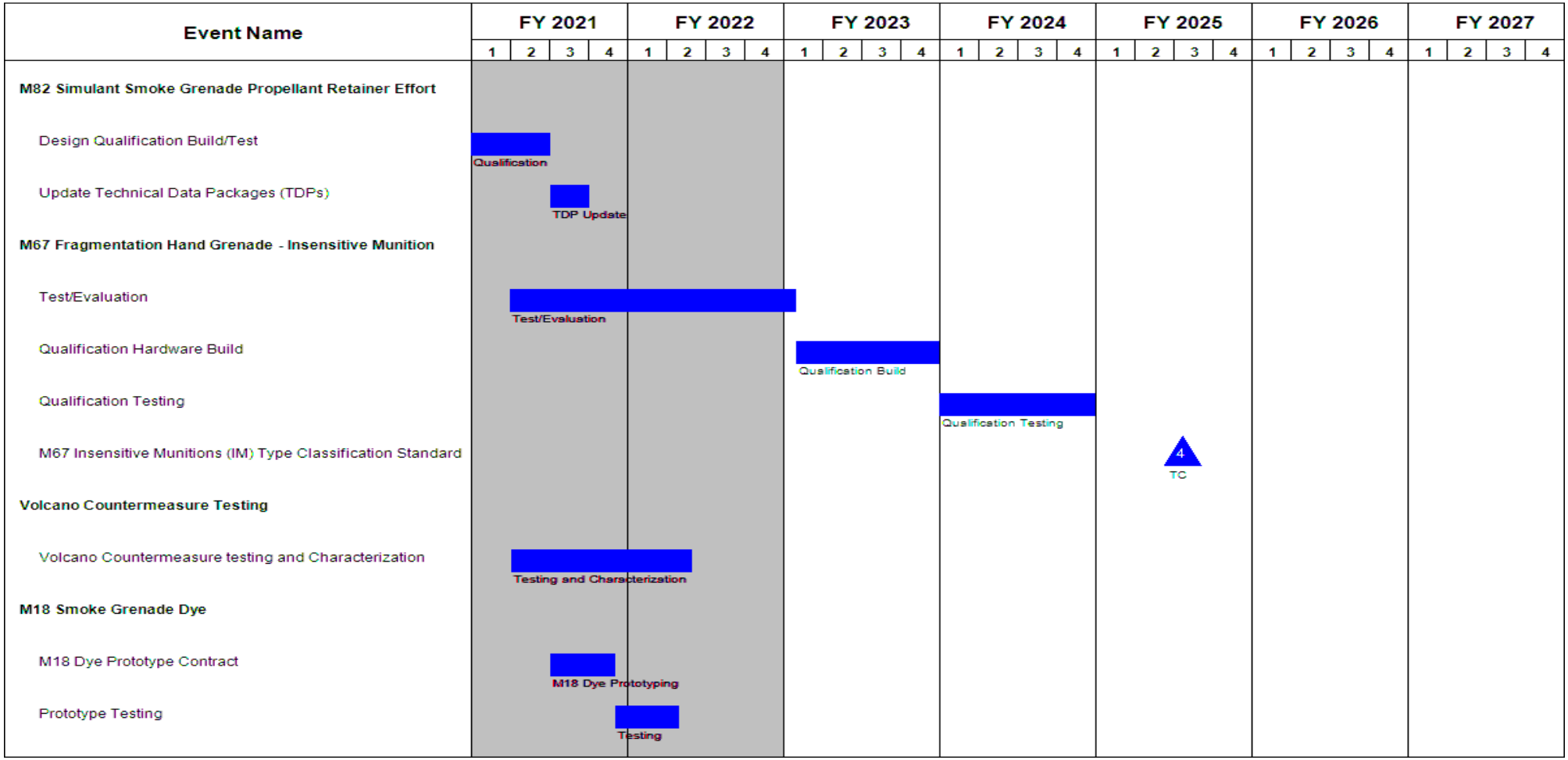

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

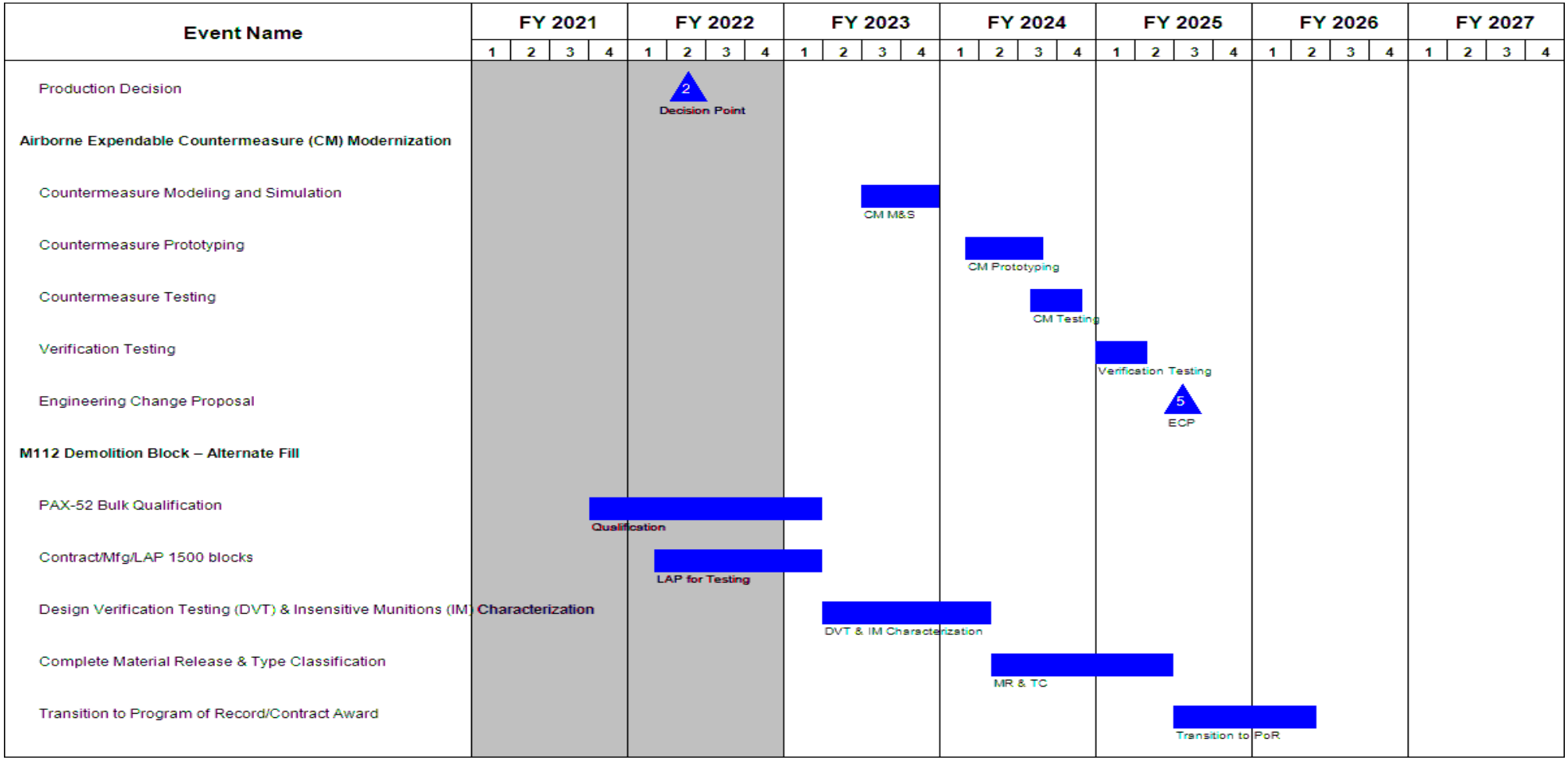

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM111 Offensive Hand Grenade Effort	1	2017	4	2023
Testing Insensitive Munitions (IM), E3	3	2018	1	2019
Limited User Assessment (LUA)	4	2018	1	2019
Type Classification (TC) Documentation	2	2018	3	2019
Type Classification	4	2019	4	2019
Prototype Development Contract Award	1	2020	1	2020
Prototype build for qualification testing	1	2020	4	2020
Qualification testing	1	2021	3	2022
Full Materiel Release (FMR)	1	2023	1	2023
M330 Obscuration Grenade	1	2017	4	2025
Hexachloroethane Titanium Oxide (HX) Toxicity Study	1	2017	1	2019
AN-M8A1 Ecological Study	4	2018	1	2019
Starter Cup Development	2	2018	3	2019
Technical Data Package (TDP) Scrub	1	2019	1	2019
Fuze Assessment	2	2019	3	2019
Trade Analysis & Requirements. Validation	2	2019	4	2019
Grenade Producibility Study	2	2019	1	2020
Requirements Finalization	1	2021	3	2021
Root Cause Test	2	2021	2	2021
Tech Data Package (TDP) Development	4	2021	3	2022
Characterization Tests	1	2022	1	2023
Design Verification Hardware Build	4	2023	1	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Design Verification Testing	1	2024	3	2024
M330 Qualification Testing	4	2024	1	2025
Finalize TDP	1	2025	2	2025
TDP-Certification & Product Readiness Review	2	2025	3	2025
M82 Simulant Smoke Grenade Propellant Retainer Effort	1	2017	3	2021
Propellant Retainer Development	1	2019	2	2019
Prototype Mold and Parts	2	2019	2	2020
Design Qualification Build/Test	4	2020	2	2021
Update Technical Data Packages (TDPs)	3	2021	3	2021
M67 Fragmentation Hand Grenade - Insensitive Munition	1	2021	4	2027
Test/Evaluation	1	2021	1	2023
Qualification Hardware Build	1	2023	4	2023
Qualification Testing	1	2024	4	2024
M67 Insensitive Munitions (IM) Type Classification Standard	3	2025	3	2025
Volcano Countermeasure Testing	1	2022	1	2022
Volcano Countermeasure testing and Characterization	2	2021	2	2022
M18 Smoke Grenade Dye	1	2021	1	2023
M18 Dye Prototype Contract	3	2021	4	2021
Prototype Testing	4	2021	2	2022
Production Decision	2	2022	2	2022
Airborne Expendable Countermeasure (CM) Modernization	1	2023	1	2028
Countermeasure Modeling and Simulation	3	2023	4	2023
Countermeasure Prototyping	1	2024	3	2024
Countermeasure Testing	3	2024	4	2024
Verification Testing	1	2025	2	2025

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER2 / *Close Combat Technology*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Engineering Change Proposal	3	2025	3	2025
M112 Demolition Block ? Alternate Fill	4	2021	3	2025
PAX-52 Bulk Qualification	4	2021	1	2023
Contract/Mfg/LAP 1500 blocks	1	2022	1	2023
Design Verification Testing (DVT) & Insensitive Munitions (IM) Characterization	2	2023	2	2024
Complete Material Release & Type Classification	2	2024	2	2025
Transition to Program of Record/Contract Award	3	2025	2	2026

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER5 / *Indirect Fire and Fuze Technology*	

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
ER5: *Indirect Fire and Fuze Technology*	-	4.712	4.463	2.454	-	2.454	2.215	2.288	2.288	2.311	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Indirect Fire and Fuze Technology Project includes product improvement development efforts to upgrade indirect fire weapon systems and munitions that have already been fielded and/or are in production. Initiatives include improved target engagement, increased reliability, availability, maintainability, and safety, standardization and interoperability with weapons and munitions of Allied Nations, defense exportability features, reduction of failure mechanisms, and supply chain risk through introduction of new and alternative technology and materiel solutions, improvement of manufacturing methods and their associated production and life cycle support processes, new capabilities in response to the evolving and emerging threats and countermeasures, and reduction/elimination of potential environmental and health risks associated with these products. Fiscal Year (FY) 2023 funding will support Fuze Technology Integration (FTI) efforts to complete conventional artillery fuze evaluations for compatibility with Long Range Precision Fire (LRPF) projectiles; expand and refine the fuze critical components database to identify and mitigate obsolescence as well as single point components and processes; develop and evaluate M734A1 mortar fuze custom application specific integrated circuit (ASIC) signal processor and accelerometer; complete implementing the M739A1/M782 artillery fuze setback mass drop safety improvement; continue integrating electronic and energetic technologies into the M213 hand grenade fuze to increase fuze and explosive safety; continue maturing extended duration artillery fuze power sources; support M783 mortar fuze evaluation, design improvement and testing to preclude early fuze functioning; evaluate miniature reserve cell batteries for use in 30mm to 40mm medium caliber fuzes.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Fuze Technology Integration (FTI)	2.263	2.321	2.454
Description: This project implements new and mature technologies into fuzing systems to preclude obsolescence, maximize standardization, enhance performance, and improve the safety and exportability of existing munitions. The FTI project addresses two major areas: (1) analysis/risk mitigation and (2) block upgrades. Analysis efforts will identify second sources for fuzing systems that may reduce costs by providing competition and maintain production when sources or parts are no longer available. It will also allow for the performance enhancement of current ammunition items by conducting studies of major fuze components to detect, identify, and correct latent defects. The second major area is block upgrades, which will identify and perform studies on improvements to fuzes, increase commonality of fuze components and requirements. Block upgrades will enable the introduction of the latest technologies into fuzing, keep the fuzing design current to avoid obsolescence issues and add capabilities.			
FY 2022 Plans: Analysis/Risk Mitigation: Will conduct engineering tests on the next generation micro-controller to modernize and replace a one-time programmable component for mortar proximity fuzes; will conduct analysis and laboratory evaluations on mortar training			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER5 / *Indirect Fire and Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
fuzes for increased safety and improved performance; will conduct analysis on conventional artillery fuzes for compatibility with Long Range Precision Fires (LRPF) munitions and requirements; will conduct analysis on alternative suppliers for critical fuzing components. Block Upgrades: Will conduct engineering tests of enhanced fuze delay mode designs on the M739A1 Point Detonation (PD) fuze for increased safety and improved performance; will conduct laboratory evaluations on the hand grenade fuzes to reduce the number of critical defects that will improve producibility and increase safety; investigate proximity fuze alternative transceivers for proximity mortar fuzes to increase capability, performance, and survivability; hand grenade safety improvements integrating electronic and energetic technologies that will also improve insensitive munition capability; integrate extended range precision artillery fuzing power sources prototypes to support extended flight durations. ***FY 2023 Plans:*** Analysis/Risk Mitigation: Complete conventional artillery fuze evaluations for compatibility with LRPF projectiles; expand and refine the fuze critical components database to identify and mitigate obsolescence and single point components & processes; and develop and evaluate M734A1 mortar fuze custom application specific integrated circuit (ASIC) signal processor and accelerometer. Block Upgrade: Complete implementing the M739A1/M782 artillery fuze setback mass drop safety improvement; continue integrating electronic and energetic technologies into the M213 hand grenade fuze to increase fuze and explosive safety; continue maturing extended duration artillery fuze power sources; support M783 mortar fuze evaluation, design improvement and testing to preclude early fuze functioning; and evaluate miniature reserve cell batteries for use in 30mm to 40mm medium caliber fuzes. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase in funding in FY 2023 due to additional FTI efforts that have been identified for execution.			
Title: Ammunition Range and Reliability Improvements ***Description:*** This Project explores possibilities of increasing range, enhancing reliability, and increasing performance of Artillery and Mortar ammunition. This effort supports analysis efforts to identify improvement areas to key parameters. ***FY 2022 Plans:*** FY 2022 funding supports the continued studies and analysis (Key Parameter Development and Management (KPDM) and Model Based Systems Engineering (MBSE)). ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in funding in FY 2023 due to completion of Ammunition Range and Reliability Improvements activities.	2.373	1.979	-
Title: Mortar Smoke Development	0.076	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER5 / *Indirect Fire and Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Description: This Project supports the incorporation of the new Hexachloroethane Zinc Oxide (HC) smoke fill formulation while utilizing the existing illumination shell body configuration to support mortar smoke training for US Army Europe (USAREUR). The HC smoke fill formulation is less toxic and less incendiary than the current Mortar Red Phosphorus (RP) or White Phosphorous (WP) Smoke rounds and will reduce risk of unintended collateral damage or environmentally hazardous waste. USAREUR has yearly requirements for procurement of smoke mortar cartridges across all calibers to be used for training, but is prohibited from training with the current WP or RP smoke munitions in Europe due to environmental restrictions.			
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	-	0.163	-
Accomplishments/Planned Programs Subtotals	4.712	4.463	2.454

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Fuze Technology Integration (FTI) will improve current production munitions by exploiting available fuzing technologies and integrating them into current fielded and/or production fuzes, providing safer, more producible, and more lethal fuzing solutions. FTI develops second source suppliers and resolves component obsolescence issues to mitigate risk and prevent production interruptions in order to continue to provide safer, more reliable munitions for the Warfighter with significant risk reduction to production fuzes also benefiting the U.S. Taxpayer. The effort is a continuation of studies, analysis, evaluations, and insertion of fuzing technologies and safe and arm devices in production and fielded fuzes. This program will implement these technologies into fuzing systems to preclude component obsolescence, maximize standardization, enhance performance, and improve the safety, reliability, and exportability of existing munitions. FTI utilizes both the competitively awarded DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) to produce prototypes of the fuze technologies and devices, and Federal Acquisition Regulation (FAR) based contracts to implement proven efforts into production fuzes.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER5 / *Indirect Fire and Fuze Technology*	

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	-	-		0.163		-		-		-	0.000	0.163	-
		Subtotal	-	-		0.163		-		-		-	0.000	0.163	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
Fuze Technology Integration Development	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	5.227	1.119	Oct 2020	1.350	Nov 2021	1.486	Nov 2022	-		1.486	0.000	9.182	-
Ammunition Range and Lethality Improvements	MIPR	TBD : TBD	-	0.316	Mar 2021	1.655	Dec 2021	-		-		-	0.000	1.971	-
Mortar Smoke Development	MIPR	Government Owned Government Operated (GOGO) Facilities : Various	0.704	-		-		-		-		-	0.000	0.704	-
		Subtotal	5.931	1.435		3.005		1.486		-		1.486	0.000	11.857	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
Fuze Technology Integration Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	4.127	1.099	Oct 2020	0.921	Nov 2021	0.918	Nov 2022	-		0.918	0.000	7.065	-
Ammunition Range and Lethality Improvements	MIPR	Combat Capabilities Development Command	0.300	2.102	Mar 2021	0.324	Dec 2021	-		-		-	0.000	2.726	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER5 / *Indirect Fire and Fuze Technology*	

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
		Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ													
Mortar Smoke Development Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	1.119	0.076	Nov 2020	-		-		-		-	0.000	1.195	-
Mortar Smoke Development Engineering Support	MIPR	Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC) : Army Research Laboratory, MD	0.382	-		-		-		-		-	0.000	0.382	-
		Subtotal	5.928	3.277		1.245		0.918		-		0.918	0.000	11.368	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
Fuze Technology Integration Ballistic Testing	MIPR	Army Test and Evaluation Command (ATEC) : Yuma Proving Ground, AZ	0.100	-		0.050	Mar 2022	0.050	May 2023	-		0.050	0.000	0.200	-
Mortar Smoke Testing	MIPR	Army Test and Evaluation Command (ATEC) : Yuma Proving Ground, AZ	0.280	-		-		-		-		-	0.000	0.280	-
		Subtotal	0.380	-		0.050		0.050		-		0.050	0.000	0.480	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER5 / *Indirect Fire and Fuze Technology*	

	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	12.239	4.712		4.463		2.454		-		2.454	0.000	23.868	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER5 / *Indirect Fire and Fuze Technology*

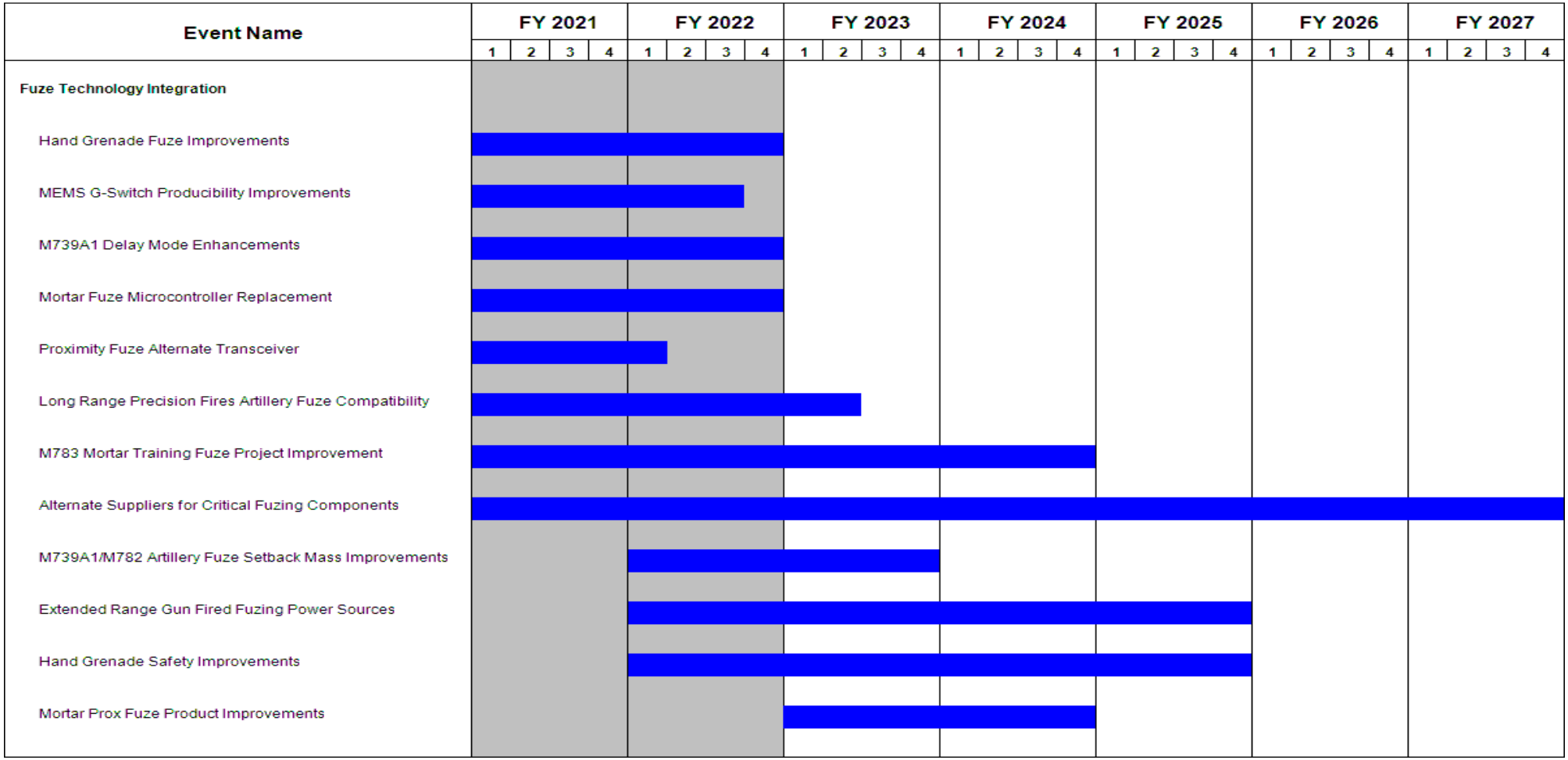

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER5 / *Indirect Fire and Fuze Technology*

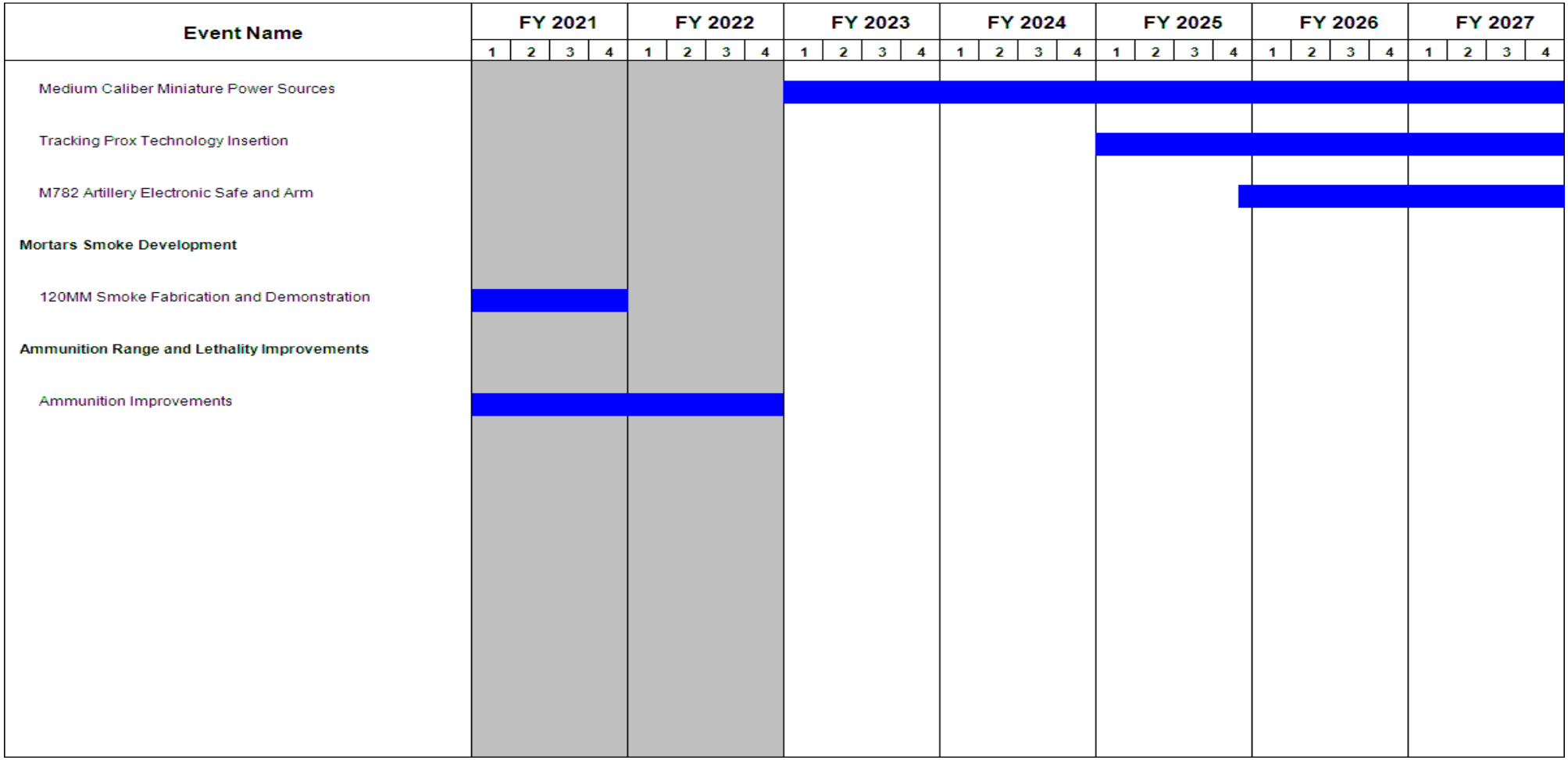

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER5 / *Indirect Fire and Fuze Technology*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Fuze Technology Integration	1	2016	4	2027
Hand Grenade Fuze Improvements	1	2020	4	2022
MEMS G-Switch Producibility Improvements	1	2018	3	2022
M739A1 Delay Mode Enhancements	1	2019	4	2022
Mortar Fuze Microcontroller Replacement	1	2020	4	2022
Proximity Fuze Alternate Transceiver	1	2021	1	2022
Long Range Precision Fires Artillery Fuze Compatibility	1	2021	2	2023
M783 Mortar Training Fuze Project Improvement	1	2021	4	2024
Alternate Suppliers for Critical Fuzing Components	1	2021	4	2027
M739A1/M782 Artillery Fuze Setback Mass Improvements	1	2022	4	2023
Extended Range Gun Fired Fuzing Power Sources	1	2022	4	2025
Hand Grenade Safety Improvements	1	2022	4	2025
Mortar Prox Fuze Product Improvements	1	2023	4	2024
Medium Caliber Miniature Power Sources	1	2023	4	2027
Tracking Prox Technology Insertion	1	2025	4	2027
M782 Artillery Electronic Safe and Arm	4	2025	4	2028
Mortars Smoke Development	1	2020	4	2021
120MM Smoke Fabrication and Demonstration	1	2019	4	2021
Ammunition Range and Lethality Improvements	1	2020	4	2022
Ammunition Improvements	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER6 / *Direct Fire Technology*	

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
ER6: *Direct Fire Technology*	-	13.436	19.687	6.413	-	6.413	2.053	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Direct Fire Technology funding will be used to support direct fire ammunition from small caliber ammunition, medium caliber ammunition and large caliber ammunition enhancements to lethality, effectiveness, survivability, accuracy and general product improvements. Fiscal Year (FY) 2023 funding supports a number of small caliber ammunition projects including improvements to training ammunition; improvements to make small caliber primers more environmentally friendly; optimization of handgun ammunition; exploring precision sniper improvements and continuing the effort to reduce Soldier load by developing lightweight ammunition. Improvements to medium caliber ammunition include lethality and safety enhancements on 40mm ammunition. Improvements to 105mm and 120mm tank ammunition include examination and implementation of performance enhancement and improvements to tracer, combustible cartridge case and 105mm Advanced Multipurpose (AMP).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Small Caliber Ammunition Product Improvements	10.558	4.407	5.413
Description: Develop, demonstrate, and qualify improvements for 5.56mm, 7.62mm, .50 cal, Next Generation Squad Weapon ammunition, Precision Sniper ammunition and Handgun ammunition to achieve an increase in overall lethality and effectiveness.			
FY 2022 Plans: FY 2022 supports Phase II development efforts for the lightweight case .50 Caliber ammunition variant, award Phase II down-select contract, prepare fielding documents, conduct a Critical Design Review (CDR). FY 2022 supports Phase III down-select to one concept for lightweight case 7.62mm ammunition variant and also conducting aging studies, obtaining safety release confirmation, conducting limited user evaluation, verification testing and preparing documents for engineering change proposal (ECP) in FY 2023. FY 2022 supports purchasing prototype equipment for the green primer pilot-line and pre-production qualification testing (PPQT) for 7.62mm green primer. FY 2022 supports improved dispersion and lethality for precision sniper ammunition particularly M1158. FY 2022 supports optimization and qualification testing to field handgun improvements such as Enhanced Ball Round (EBR) and Breeching capability.			
FY 2023 Plans: FY 2023 request will support development efforts for lightweight case .50 Caliber variant, material assessment, finalize design, and procure qualification sample, conduct qualification test. FY 2023 request will support an interim metallic solution development effort while developing the polymer case solution for lightweight case 7.62mm ammunition variant. FY 2023 will down-select to a single metallic solution, test polymer data, perform polymer aging study and material analysis, and conduct Lake City Army Ammunition Plant (LCAAP) Impact Study.			

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER6 / *Direct Fire Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2023 request will support completing pre-production qualification testing (PPQT) for 7.62mm green primer, completing Energetic Qualification (EMQB) and initiate prototype machine design. FY 2023 request will support improved dispersion and lethality for precision sniper ammunition particularly M1158. FY 2023 request will support testing to field handgun improvements such as Enhanced Ball Round (EBR) and Breeching capability. FY 2023 request will support PPQT safety release, limited user evaluation, critical design review of 7.62mm M118LRA1 which improves sniper lethality. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding increase due to new focus on both metallic and polymer case as viable lightweight case solutions.			
Title: Medium Caliber Ammunition Product Improvements ***Description:*** Develop, demonstrate, and qualify improvements for 20mm, 25mm, 30mm, and 40mm ammunition. 40mm M433E1 will improve lethality (fragmentation) of the M433 grenade. The 40mm M550 fuze replacement will replace the single stage fuze with a dual spinlock fuze to improve safety and performance reliability. Improve safety, performance and reliability issues on the 20mm M940 ammunition. ***FY 2022 Plans:*** FY 2022 supports finalizing type classification, full materiel release, and the technical data package for M433E1 and M550 fuze improvement. FY 2022 the Government is investigating 20mm ammunition safety, performance and reliability issues to achieve an increase in overall lethality and effectiveness including analysis of the self-destruct feature. Testing on the 20mm M940 conversion from metal to plastic rotating band technology to reduce barrel wear on the M61 gun. ***FY 2023 Plans:*** FY 2023 funding supports continuing various 20mm, 30mm, 40mm ammunition improvement efforts, such as investigating safety, performance, reliability issues, and reducing barrel wear. Type Classify M433E1 and M550 fuze improvement. Develop and demonstrate methods for increasing range, increasing system effectiveness through velocity correction, and improving point detonation sensitivity of the XM1166 cartridge. Develop, demonstrate and qualify an improved 40mm Smoke munition, including assessing current formulations compliance with environmental regulations and evaluating producibility of 40mm smoke munitions. Assess the potential to include a capability to obscure heat and Infra-Red (IR) signatures. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding decrease due to M433E1 type classification in early FY 2023.	1.495	1.033	0.500
Title: Tank Ammunition Product Improvements ***Description:*** Develop and test potential improvements to 105mm and 120mm gun system ammunition.	1.383	1.003	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER6 / *Direct Fire Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: FY 2022 funding supports continuing various 105mm and 120mm tank ammunition improvement efforts, including tracer improvements, combustible cartridge case design and fabrication improvements, and continuing efforts to assess the 105mm Advanced Multipurpose (AMP) cartridge/solution. Evaluate 105mm candidate cartridges, perform warhead lethality studies, modeling and simulation, conduct fuze assessment studies, perform propulsion system evaluation, assess fabrication improvements, and perform integration and testing of tank cartridges. ***FY 2023 Plans:*** FY 2023 funding supports continuing various 105mm and 120mm tank ammunition improvement efforts, including tracer improvements, combustible cartridge case design and fabrication improvements, and continuing efforts to assess the 105mm Advanced Multipurpose (AMP) and 120mm AMP training cartridge/solution. Evaluate 105mm candidate cartridges, perform warhead lethality studies, modeling and simulation, conduct fuze assessment studies, perform propulsion system evaluation, assess fabrication improvements, and perform integration and testing of tank cartridges. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funding decrease due to 105mm foreign comparative testing will be complete.			
Title: Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR) ***Description:*** 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.	-	0.244	-
Accomplishments/Planned Programs Subtotals	13.436	6.687	6.413

	FY 2021	FY 2022
Congressional Add: Tungsten Manufacturing Affordability Initiative for Armaments	-	8.000
FY 2022 Plans: Improve capacity for novel swaging/finishing for long rod penetrators. Scale up production capacity to support emerging fragmentation requirements. Provide a higher level of consistency in material properties, improve capacity for production and surge requirements, and reduce cost. Establish new		

Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
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	FY 2021	FY 2022
manufacturing source for industry to produce components for military applications. Perform assessment of deliverables and manufacturing readiness assessments.		
Congressional Add: Printed Electronics (PEEMS)	-	5.000
FY 2022 Plans: Meet US Army?s Priority to ensure the total Army is ready to deploy fight and win across Multi-Domain Operations. Utilize 10 USC 2368 authority to enhance Army?s PEEM Innovation Center of Excellence to design, develop, and integrate Printed Electronics for Producibility that employs the use of cost effective prototyping and fabrication techniques for the manufacture of flexible circuits, power sources, sensors, energy harvesting systems, antennas, MEMS and electronic components to increase force effectiveness and reduce operations and support costs. Partnering with New Jersey Based 501C3, and additional small business to expand opportunities to support DOD objectives. Share and leverage best practices with existing and new strategic thrusts; Agile Innovation Management (AIM), Printed Electronics (PEEMS), and Transformative Manufacturing. Enhance PEEMS.		
Congressional Adds Subtotals	-	13.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The acquisition strategy for small, medium and large caliber product improvements is that all contracts will be full and open competition.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER6 / *Direct Fire Technology*	

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	-	-		0.244		-		-		-	0.000	0.244	-
		Subtotal	-	-		0.244		-		-		-	0.000	0.244	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
Lightweight Case Ammunition - Polymer	C/FFP	TBD : TBD	-	3.000	Mar 2022	-		1.500	Mar 2023	-		1.500	Continuing	Continuing	Continuing
Lightweight Case Ammunition - Polymer	C/FP	Frontier Performance Polymers Corp : Dover, New Jersey	-	0.857	Nov 2021	-		-		-		-	0.000	0.857	-
Lightweight Case Ammunition	C/FFP	TBD : TBD	-	-		1.580	Jun 2022	-		-		-	0.000	1.580	-
Green Primer - Contract 1	C/FFP	Innovative Materials & Processes (IMP), LLC : Rapid City, South Dakota	0.117	0.119	Jul 2021	-		-		-		-	0.000	0.236	-
Green Primer - Contract 2	C/FFP	TBD : TBD	-	-		-		1.500	Mar 2023	-		1.500	0.000	1.500	-
M118LRA1 - Contract 1	C/FFP	Vista : Anoka, Minnesota	0.548	0.182	Feb 2021	0.565	Oct 2021	-		-		-	0.000	1.295	-
M118LRA1 - Contract 2	C/FFP	TBD : TBD	-	-		-		0.300	Mar 2023	-		0.300	Continuing	Continuing	Continuing
Tank Ammunition Foam Celluloid Contract	C/FFP	Polymer Processing Institute : Newark, New Jersey	0.391	0.203	Mar 2021	-		-		-		-	0.000	0.594	-
Tank Ammunition 105mm HE - Contract	Option/ FFP	IMI Systems, LTD : Ramat Hasharon, Israel	-	0.275	Apr 2021	-		-		-		-	0.000	0.275	-
M433E1 Cartridge Case Redesign Contract	Option/ IDIQ	AMTEC Corporation : Janesville, WI	-	0.307	Sep 2021	-		-		-		-	0.000	0.307	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER6 / *Direct Fire Technology*	

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
Tungsten Manufacturing - Contract	C/FFP	TBD : TBD	-	-		7.200	Aug 2022	-		-		-	0.000	7.200	-
Printed Electronics PEEMS - Contract	C/FFP	TBD : TBD	-	-		4.520	Aug 2022	-		-		-	0.000	4.520	-
		Subtotal	1.056	4.943		13.865		3.300		-		3.300	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 - Small, Medium & Large Caliber	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	7.506	4.647	Nov 2020	2.900	Nov 2021	1.825	Nov 2022	-		1.825	Continuing	Continuing	Continuing
Navy Engineering support LSCA	MIPR	NSWC INDIAN HEAD EOD TECH DIV : Picatinny Arsenal, New Jersey	-	0.853	Dec 2021	-		-		-		-	0.000	0.853	-
Engineering Support - Tungsten Manufacturing	MIPR	DEVCOM Armaments Center : Picatinny, NJ	-	-		0.800	Jun 2022	-		-		-	0.000	0.800	-
Engineering Support - Printed Electronics PEEMS	MIPR	DEVCOM Armaments Center : Picatinny, NJ	-	-		0.480	Jun 2022	-		-		-	0.000	0.480	-
		Subtotal	7.506	5.500		4.180		1.825		-		1.825	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army			Date: April 2022
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607131A / *Weapons and Munitions Product Improvement Programs*	Project (Number/Name) ER6 / *Direct Fire Technology*	

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
ARL Test Support Small Medium & Large Caliber	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	2.405	0.920	Dec 2020	1.298	Feb 2022	0.600	Jan 2023	-		0.600	Continuing	Continuing	Continuing
ATC Test Support Small Medium & Large Caliber	MIPR	Aberdeen Test Center (ATC) : Aberdeen, Maryland	2.000	1.998	Jan 2021	0.100	Jun 2022	0.688	Jan 2023	-		0.688	Continuing	Continuing	Continuing
Ballistic Support Office (BSO at LCAAP)	MIPR	Joint Munitions Command (JMC) : Independence, Missouri	0.125	0.075	Jan 2021	-		-		-		-	0.000	0.200	-
		Subtotal	4.530	2.993		1.398		1.288		-		1.288	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	13.092	13.436		19.687		6.413		-		6.413	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER6 / *Direct Fire Technology*

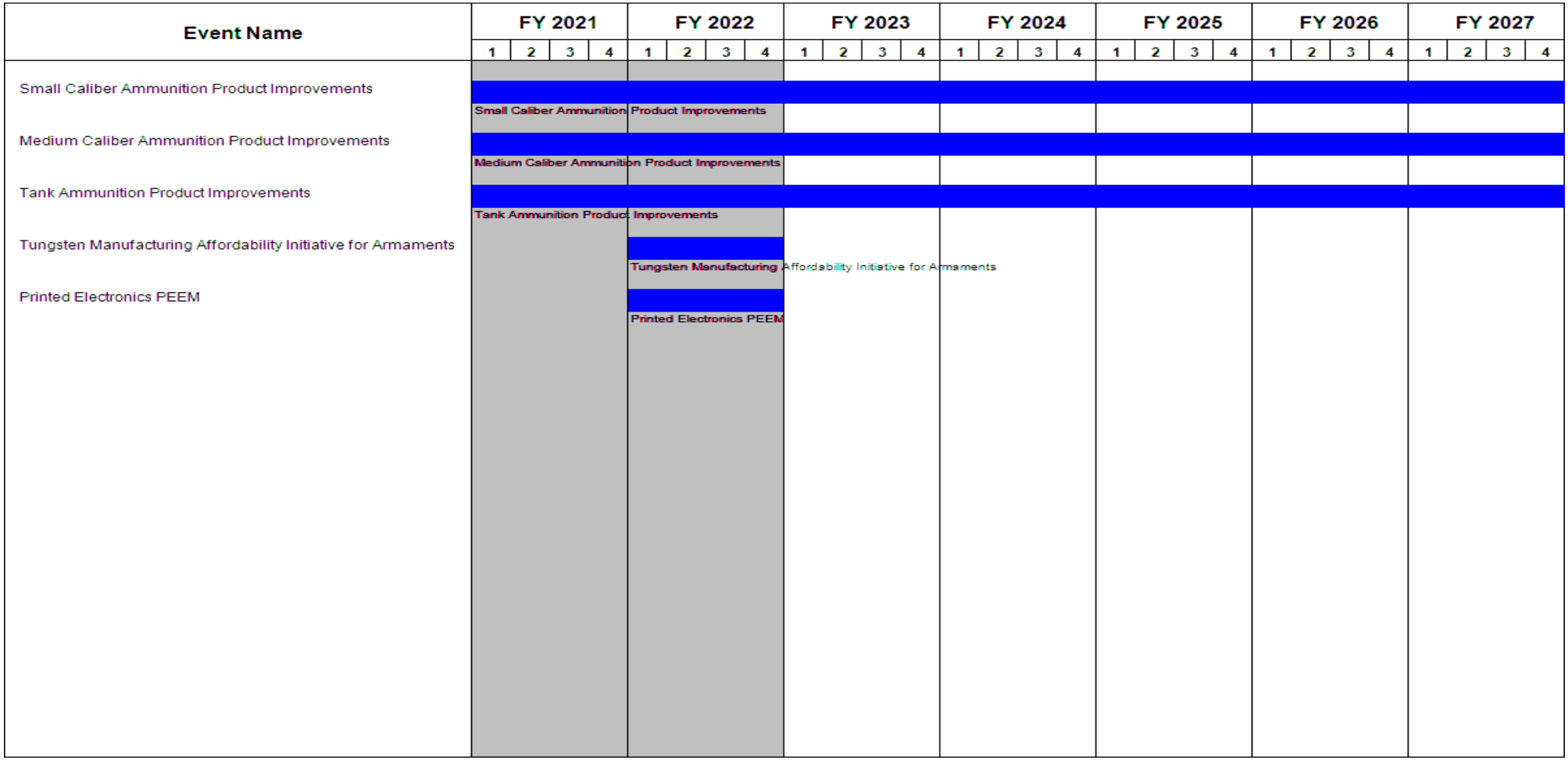

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607131A / *Weapons and Munitions Product Improvement Programs*	**Project (Number/Name)** ER6 / *Direct Fire Technology*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Small Caliber Ammunition Product Improvements	1	2018	4	2033
Medium Caliber Ammunition Product Improvements	1	2018	4	2033
Tank Ammunition Product Improvements	1	2018	4	2033
Tungsten Manufacturing Affordability Initiative for Armaments	1	2022	4	2022
Printed Electronics PEEM	1	2022	4	2022