

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs
--	--

COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	39.994	57.174	8.425	-	8.425	5.843	5.936	6.056	6.178	Continuing	Continuing
CP2: Precision Fire Technology Improvements	-	9.634	-	3.451	-	3.451	3.542	3.633	3.728	3.825	0.000	27.813
ER2: Close Combat Technology	-	3.341	5.307	0.687	-	0.687	-	-	-	-	Continuing	Continuing
ER5: Indirect Fire and Fuze Technology	-	2.576	2.454	2.225	-	2.225	2.301	2.303	2.328	2.353	Continuing	Continuing
ER6: Direct Fire Technology	-	24.443	49.413	2.062	-	2.062	-	-	-	-	Continuing	Continuing

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

Project CP2 Precision Fire Technology Improvements supports required Precision Guided Munitions (PGMs), and Precision Fuze and Fuze Setter 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 PGM and Fuze technologies to increase range, lethality, effectiveness, survivability and accuracy. Fiscal Year (FY) 2024 funding will support software development, integration activities and continued monitoring of the upgrade strategies and requirements of interfacing Precision Guided Munition Programs in support of Artillery ammunition and platform modernization. FY 2024 funding will also support fuze setting integration activities required for compatibility with the Extended Range Cannon Artillery (ERCA) weapon system.

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 are fielded and/or 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 the 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) 2024 funding will support Fuze Technology Integration (FTI) efforts to complete the M783 mortar fuze evaluation, design improvement and testing to preclude early fuze functioning; expand and refine the fuze critical components database to identify and mitigate obsolescence; continue to mature extended duration artillery fuze power sources; develop and evaluate M734A1 mortar fuze custom application specific integrated circuit (ASIC) signal processors and accelerometers; integrate electronic and energetic technologies into the M213 hand grenade fuze to increase fuze and explosive safety; evaluate

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>
---	---

miniature reserve cell batteries for use in 30mm to 40mm medium caliber fuzes; and complete improvements to proximity fuze sensor hardware in the loop testing infrastructure.

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) 2024 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. 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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	35.828	11.674	4.952	-	4.952
Current President's Budget	39.994	57.174	8.425	-	8.425
Total Adjustments	4.166	45.500	3.473	-	3.473
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	43.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	4.166	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	3.473	-	3.473
• Ukraine Supplemental	-	2.500	-	-	-

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

**Project:** ER6: *Direct Fire Technology*

Congressional Add: *Tungsten Manufacturing Affordability Initiative for Armaments*

Congressional Add: *Printed Electronics (PEEMS)*

Congressional Add: *Lightweight Case for Small Caliber Ammunition (LSCA)*

Congressional Add: *Smart Manufacturing for Armaments*

Congressional Add: *Additive Manufacturing for Weapons and Armaments Components*

Congressional Add: *Refractory Metal Alloys for Hypersonics*

Congressional Add: *Proof of Concept Military-Grade Antimony Trisulfide*

	<b>FY 2022</b>	<b>FY 2023</b>
	8.000	-
	5.000	-
	5.000	-
	-	5.000
	-	10.000
	-	10.000
	-	10.000

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2024 Army	<b>Date:</b> March 2023
---	-------------------------

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>
---	---

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

Congressional Add: *Next Generation Carbide Ammunition*

Congressional Add Subtotals for Project: ER6

Congressional Add Totals for all Projects

	FY 2022	FY 2023
	-	8.000
	18.000	43.000
	18.000	43.000

**Change Summary Explanation**

The change in program funding is part of the Precision Fire Technology Improvements. Increase in funding in FY2024 is due to the additional Fuze Setter Modernization efforts that have been identified for execution in support of the Army's modernization priorities.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs				<b>Project (Number/Name)</b> CP2 / Precision Fire Technology Improvements			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
CP2: Precision Fire Technology Improvements	-	9.634	-	3.451	-	3.451	3.542	3.633	3.728	3.825	0.000	27.813
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**  
Fiscal Year (FY) 2023 was a skip year for project CP2. Funding resumes in FY 2024.

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

This Project supports required Precision Guided Munitions (PGMs), and Precision Fuze and Fuze Setter 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 PGM and Fuze technologies to increase range, lethality, effectiveness, survivability and accuracy. Fiscal Year (FY) 2024 funding will support software development, integration activities and continued monitoring of the upgrade strategies and requirements of interfacing Precision Guided Munition Programs in support of Artillery ammunition and platform modernization. FY 2024 funding will also support fuze setting integration activities required for compatibility with the Extended Range Cannon Artillery (ERCA) weapon system.

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p><b>Title:</b> Enhanced Portable Inductive Artillery Fuze Setter (EPIAFS) Modernization</p> <p><b>Description:</b> 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 the Extended Range Cannon Artillery (ERCA) weapon system as well as 155mm Artillery modernization efforts.</p> <p><b>FY 2024 Plans:</b> FY 2024 funding will support requirements management, software development and integration activities in support of 155mm Artillery ammunition and platform modernization. FY 2024 funding will also support fuze setting integration activities required for compatibility with the Extended Range Cannon Artillery (ERCA).</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY 2023 was a skip year. Increase in funding in FY 2024 to support required Fuze Setter Modernization efforts for current and future Precision Guided Munitions (PGMs) and Fuzes.</p>	3.299	-	3.451
<p><b>Title:</b> Excalibur Ib Modernization</p> <p><b>Description:</b> This effort will complete a series of Excalibur Ib safety and reliability test activities to ensure survivability at higher pressures in the ERCA system.</p>	6.335	-	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> CP2 / <i>Precision Fire Technology Improvements</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Accomplishments/Planned Programs Subtotals</b>	9.634	-	3.451

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

N/A

**Remarks**

**D. Acquisition Strategy**

The EPIAFS Modernization effort is utilizing 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 Federal Acquisition Regulation (FAR) production contracts as they become available.

The Excalibur Ib Modernization effort is utilizing existing Engineering Services contract with Raytheon Missiles and Defense as well as contracts to support modernization activities. Upon successful completion, improvements will be integrated via ECP in the Excalibur Ib production contract.

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> CP2 / Precision Fire Technology Improvements
--	--	--

<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Excalibur Ib Modernization Component Hardware	Various	To Be Determined : TBD	-	0.234	Sep 2022	-		-		-		-	0.000	0.234	-
Excalibur Ib Modernization Hardware	SS/CPFF	Raytheon Missiles and Defense (RMD) : Tuscon, AZ	-	4.115	Sep 2022	-		-		-		-	0.000	4.115	-
EPIAFS Modernization Development and Hardware	Various	To Be Determined : TBD	-	0.932	Jul 2022	-		1.259	Jun 2024	-		1.259	0.000	2.191	-
<b>Subtotal</b>			-	5.281		-		1.259		-		1.259	0.000	6.540	N/A

<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Excalibur Ib Modernization Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	0.453	Apr 2022	-		-		-		-	0.000	0.453	-
EPIAFS Modernization Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	2.007	Apr 2022	-		1.792	Nov 2023	-		1.792	0.000	3.799	-
EPIAFS Modernization Platform/Fire Control Integration Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	0.100	Apr 2022	-		0.100	Nov 2023	-		0.100	0.000	0.200	-
EPIAFS Modernization Cybersecurity Support	MIPR	Combat Capabilities Development	-	0.100	Nov 2021	-		0.100	Nov 2023	-		0.100	0.000	0.200	-

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> CP2 I Precision Fire Technology Improvements
--	--	--

<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ													
<b>Subtotal</b>			-	2.660		-		1.992		-		1.992	0.000	4.652	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Excalibur Ib High Pressure Setback Testing	MIPR	Army Test and Evaluation Command (ATEC), Yuma Proving Grounds : Yuma, AZ	-	0.525	Jul 2022	-		-		-		-	0.000	0.525	-
Excalibur Ib Safety Margin and Reliability Testing	MIPR	Army Test and Evaluation Command (ATEC), Yuma Proving Grounds : Yuma, AZ	-	0.968	Jul 2022	-		-		-		-	0.000	0.968	-
EPIAFS Modernization Environmental Testing	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	0.100	Aug 2022	-		0.100	Aug 2024	-		0.100	0.000	0.200	-
EPIAFS Modernization Firing Testing	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	-	0.100	Aug 2022	-		0.100	Aug 2024	-		0.100	0.000	0.200	-
<b>Subtotal</b>			-	1.693		-		0.200		-		0.200	0.000	1.893	N/A

**UNCLASSIFIED**

<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2024 Army</b>								<b>Date: March 2023</b>			
<b>Appropriation/Budget Activity</b> 2040 / 7				<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs				<b>Project (Number/Name)</b> CP2 / Precision Fire Technology Improvements			
	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	-	9.634	-	3.451	-	3.451	0.000	13.085	N/A		

**Remarks**  
 EPIAFS = Enhanced Portable Inductive Artillery Fuze Setter

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>			<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> CP2 / Precision Fire Technology Improvements	

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>EPIAFS Modernization</b>																												
Configuration Management																												
Configuration Management																												
Setter / Software Development																												
Setter / Software Development																												
Requirements & Architecture Development																												
Requirements & Architecture Development																												
Power / Data Transmission Trade Studies																												
Power / Data Transmission Trade Studies																												
Developmental Projectile & Fuze Setting Integration																												
Developmental Projectile & Fuze Setting Integration																												
ERCA Setting Integration																												
ERCA Increased Rate of Fire Setting Integration																												
Design For Reliability & Testing Trade Studies																												
Design For Reliability & Testing Trade Studies																												
<b>Excalibur lb Modernization</b>																												
High Pressure Setback Testing																												
High Pressure Setback Testing																												
Margin Improvements Analysis																												
Margin Improvements Analysis																												
Safety & Reliability Testing																												
Safety & Reliability Testing																												

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> CP2 / <i>Precision Fire Technology Improvements</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
EPIAFS Modernization	1	2022	4	2026
Configuration Management	1	2022	4	2028
Setter / Software Development	3	2022	4	2028
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
ERCA Setting Integration	3	2022	3	2025
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

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs				<b>Project (Number/Name)</b> ER2 / Close Combat Technology			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
ER2: Close Combat Technology	-	3.341	5.307	0.687	-	0.687	-	-	-	-	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 2024 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)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p><b>Title:</b> M330 Obscuration Grenade</p> <p><b>Description:</b> 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 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.</p> <p><b>FY 2023 Plans:</b> FY 2023 funding supports the completion of the hardware build for Product Qualification Testing (PQT) and the begins the qualification testing in support of Type Classification.</p> <p><b>FY 2024 Plans:</b> FY 2024 funding supports the completion of the PQT and preparation for Type Classification.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY24 funding required to support Type Classification.</p>	1.137	3.269	0.300
<p><b>Title:</b> M67 (G881) Fragmentation Hand Grenade</p> <p><b>Description:</b> 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</p>	1.432	1.135	0.287

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER2 / <i>Close Combat Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>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.</p> <p><b>FY 2023 Plans:</b> FY 2023 funding supports the completion of Engineering testing.</p> <p><b>FY 2024 Plans:</b> FY 2024 funding will finalize the load, assemble, pack (LAP) of qualification hardware in support of qualification testing of the IM compliant fuze for the M67 fragmentation grenade.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY 2024 funding required to LAP hardware in preparation for qualification testing.</p>				
<p><b>Title:</b> M112 Demolition Block - Alternate Fill</p> <p><b>Description:</b> This effort will qualify a more environmentally friendly 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 OCONUS single point failure within the production of the M112 Demolition Block.</p> <p><b>FY 2023 Plans:</b> FY 2023 funding supports the evaluation and Army Energetic Materials Qualification Board (EMQB) required delta qualification testing of Ensign Bickford produced PAX-52.</p> <p><b>FY 2024 Plans:</b> FY 2024 funding will support the completion of EMQB required delta qualification testing of Ensign Bickford produced PAX-52 and LAP of blocks for testing.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY 2024 funding required to complete EMQB required delta qualification testing.</p>		0.284	0.661	0.100
<p><b>Title:</b> M82 Simulant Smoke Practice Grenade</p> <p><b>Description:</b> 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</p>		0.365	0.140	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
the legacy design. The improvement to the design will provide the soldier with a reliable training device thus increasing Soldier readiness.			
<b>FY 2023 Plans:</b> FY 2023 funding supports qualification of the booster-burster.			
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> The decrease in M82 Simulant Smoke Practice Grenade effort is a result of the completion of required purchases in FY23 needed to finalize the actions need in support of qualification testing.			
<b>Title:</b> M18 Smoke Grenade Dye	0.123	-	-
<b>Description:</b> 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.			
<b>Title:</b> SBIR/STTR Transfer	-	0.102	-
<b>FY 2023 Plans:</b> Funding transferred in accordance with Title 15 USC 638			
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638			
<b>Accomplishments/Planned Programs Subtotals</b>	3.341	5.307	0.687

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• E31911: GRENADE, HAND:SMOKE, SCREENING, M330	-	-	2.968	-	2.968	-	3.027	3.058	3.089	0.000	12.142
• E32000: GRENADE, Hand, Frag, Delay, M67	3.358	5.005	0.457	-	0.457	0.104	0.313	0.310	0.311	0.000	9.858

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER2 / <i>Close Combat Technology</i>
--	---	--

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

Line Item	FY 2022	FY 2023	FY 2024	FY 2024	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Cost To	Total Cost
			Base	OCO	Total					Complete	
• E50601: <i>CHARGE, Demo Blk Comp C-4 1-1/4 lb, M112</i>	1.982	-	0.000	-	0.000	-	-	-	-	0.000	1.982
• E34001: <i>GRENADE, Hand, Smoke, Green, M18</i>	2.999	2.864	3.554	-	3.554	3.515	3.479	3.536	3.593	0.000	23.540
• E34002: <i>GRENADE, Hand, Smoke, Yellow, M18</i>	5.760	2.424	3.444	-	3.444	3.405	3.460	3.517	3.574	0.000	25.584
• E34003: <i>GRENADE, Hand, Smoke, Red, M18</i>	-	-	3.650	-	3.650	3.710	3.771	3.834	3.897	0.000	18.862
• E34004: <i>GRENADE, Hand, Smoke, Violet, M18</i>	-	2.789	3.395	-	3.395	3.450	3.506	3.563	3.621	0.000	20.324

**Remarks**

**D. Acquisition Strategy**

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 Testing, system qualification testing, implement the final design into the technical data package, and prepare for LRIP and production.

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.

Upon qualification of PAX-52 as a bulk explosive and qualification for use in the M112 as an alternative to C4, it will be incorporated into the M112 TDP via an Engineering Change Proposal (ECP). Starting in FY 2027, a new contract for M112 will be established. M112 orders will be placed for the alternate (PAX-52) fill configuration, unless the current C4 configuration is specifically requested.

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.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER2 / <i>Close Combat Technology</i>

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.

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology
--	--	---

<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.102		-		-		-	0.000	0.102	Continuing
<b>Subtotal</b>			-	-		0.102		-		-		-	0.000	0.102	N/A

<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
M330 Hardware Build and LAP	MIPR	Pine Bluff Arsenal : White Hall, AR	-	-		0.750	Feb 2023	-		-		-	0.000	0.750	-
M67 (G881) Fragmentation Hand Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.401	-		0.379	May 2023	-		-		-	0.000	0.780	-
M67 Load Assemble and Pack (LAP)	C/FFP	Battelle Memorial Institute : Columbus, OH	0.242	-		0.291	Aug 2023	-		-		-	0.000	0.533	-
M67 Change in packaging Build	TBD	TBD : TBD	-	-		0.100	May 2023	-		-		-	0.000	0.100	-
M112 Demolition Block - Alternate Fill Effort Materials	C/FFP	Leidos Inc : Reston, VA	-	0.118	Sep 2022	0.180	May 2023	-		-		-	0.000	0.298	-
M330 Enhanced Obscuration Grenade	MIPR	Pine Bluff Arsenal : White Hall, AR	0.190	0.150	Apr 2022	-		-		-		-	0.000	0.340	-
M67 DEVCOM AC upgraded LAP tooling	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.190	Feb 2023	-		-		-		-	0.000	0.190	-
M67 Energetic Material for IM Testing	C/IDIQ	Joint Munitions Command : Rock Island, IL	-	0.139	Jun 2022	-		-		-		-	0.000	0.139	-
M112 Demolition Block - Alternate Fill Effort Materials	C/IDIQ	Joint Munitions Command : Rock Island, IL	-	0.016	Feb 2023	-		-		-		-	0.000	0.016	-

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology
--	--	---

<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
M82 Simulant Smoke Practice Grenade	C/FFP	Battelle Memorial Institute : Columbus, OH	-	0.257	Jan 2023	-		-		-		-	0.000	0.257	-
M67 Fragmentation Fuze Prototype	C/CPIF	IMI Systems : Israel	0.194	-		-		-		-		-	0.000	0.194	-
M18 Smoke Grenade	C/FFP	Leidos Inc : Reston, VA	0.170	-		-		-		-		-	0.000	0.170	-
<b>Subtotal</b>			1.197	0.870		1.700		-		-		-	0.000	3.767	N/A

<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
M330 Enhanced Obscuration Grenade	MIPR	DEVCOM Chemical Biological Center : Edgewood, MD	1.416	0.499	Mar 2022	0.251	Aug 2023	0.100	Oct 2023	-		0.100	Continuing	Continuing	-
M330 Enhanced Obscuration Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	1.009	0.488	Mar 2022	0.831	Apr 2023	0.200	Oct 2023	-		0.200	Continuing	Continuing	-
M67 (G881) Fragmentation Hand Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.725	0.903	Jun 2022	0.240	Feb 2023	0.287	Oct 2023	-		0.287	Continuing	Continuing	-
M112 Demolition Block - Alternate Fill	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.400	-		0.256	Jan 2023	0.100	Oct 2023	-		0.100	Continuing	Continuing	-
M67 Interim End User Assessment	C/CPFF	Millennium : Picatinny Arsenal, NJ	-	-		0.125	Mar 2023	-		-		-	0.000	0.125	-
M67 Fragmentation Hand Grenade Shipping	Allot	Shipping : Picatinny Arsenal, NJ	0.003	0.030	Nov 2022	-		-		-		-	0.000	0.033	-
M82 Simulant Smoke Practice Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.510	0.005	May 2022	-		-		-		-	0.000	0.515	-

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology
--	--	---

<b>Support (\$ in Millions)</b>				<b>FY 2022</b>		<b>FY 2023</b>		<b>FY 2024 Base</b>		<b>FY 2024 OCO</b>		<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
M18 Smoke Grenade	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	0.030	0.048	Dec 2022	-		-		-		-	0.000	0.078	-
PD CAPS Warhead Specialist	C/CPFF	American Systems Corporation : Chantilly, VA	-	0.038	Jan 2023	-		-		-		-	0.000	0.038	-
<b>Subtotal</b>			4.093	2.011		1.703		0.687		-		0.687	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2022</b>		<b>FY 2023</b>		<b>FY 2024 Base</b>		<b>FY 2024 OCO</b>		<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
M330 Qualification Testing	MIPR	ATEC : Aberdeen Proving Ground, MD	-	-		0.837	Mar 2023	-		-		-	0.000	0.837	-
M330 Air Drop and E3 Testing	MIPR	TBD : TBD	-	-		0.600	Apr 2023	-		-		-	0.000	0.600	-
M112 Demolition Block - Alternate Fill Delta EMQB Tests	TBD	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		0.175	May 2023	-		-		-	0.000	0.175	-
M112 Demolition Block - Alternate Fill Engineering Tests	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	-		0.050	Jul 2023	-		-		-	0.000	0.050	-
M82 Simulant Smoke Practice Grenade	MIPR	Pine Bluff Arsenal : White Hall, AR	0.695	0.103	Mar 2022	0.140	Jun 2023	-		-		-	0.000	0.938	-
M67 Engineering Testing	MIPR	Aberdeen Test Center : Aberdeen Proving Grounds, MD	0.503	0.170	Nov 2022	-		-		-		-	0.000	0.673	-
M112 Demolition Block - Alternate Fill Penetrometer & Modified Energy Output Testing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	-	0.150	Jul 2022	-		-		-		-	0.000	0.150	-



**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
<b>M330 Obscuration Grenade</b>																																
Tech Data Package (TDP) Development																																
Engineering Tests																																
Product Qualification Hardware Procurement & Build																																
Production Qualification Testing																																
Type Classification & Material Release Approvals & Certs																																
Finalize & Certify TDP																																
Product Readiness Review																																
<b>M67 Fragmentation Hand Grenade - Insensitive Munition</b>																																
Test/Evaluation																																
Qualification Hardware Build																																
Qualification Testing																																
Type Classification Activities																																

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028							
	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				
M67 Insensitive Munitions (IM) Type Classification Standard																													2 TC			
<b>M112 Demolition Block – Alternate Fill</b>																																
Produce 50lb Batches of PAX-52																													Produce PAX-52 Batches			
Delta EMQB of EBAD bulk PAX-52																													Delta EMQB			
Produce and LAP 1500 M112-like Blocks																													Produce & LAP Blocks			
Design Verification Testing (DVT) & Insensitive Munition...																													DVT & IM Testing			
M112 ECP																													ECP			
Contract Award																													Contract Award			
<b>M82 CH-6 Booster Replacement</b>																																
Baseline Testing and Dented Testing on the CH-6																													Baseline Testing			
Booster Engineering Tests of BPXN-5																													Engineering Tests			
Booster Burster Qualification																													Qualification			
Update Technical Data Packages (TDPs)																													TDP Update			

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date: March 2023</b>
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER2 / Close Combat Technology

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>M18 Smoke Grenade Dye</b>																												
Prototype Testing																												
Production Decision																												
Synthetic Process TDP																												

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER2 / <i>Close Combat Technology</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
M330 Obscuration Grenade	1	2017	4	2025
Tech Data Package (TDP) Development	4	2021	1	2023
Engineering Tests	1	2022	1	2023
Product Qualification Hardware Procurement & Build	1	2023	3	2023
Production Qualification Testing	3	2023	2	2024
Type Classification & Material Release Approvals & Certs	2	2024	2	2025
Finalize & Certify TDP	1	2025	2	2025
Product Readiness Review	2	2025	2	2025
M67 Fragmentation Hand Grenade - Insensitive Munition	1	2021	4	2027
Test/Evaluation	1	2021	3	2023
Qualification Hardware Build	4	2023	4	2024
Qualification Testing	1	2025	4	2025
Type Classification Activities	1	2026	4	2026
M67 Insensitive Munitions (IM) Type Classification Standard	4	2026	4	2026
M112 Demolition Block - Alternate Fill	4	2021	1	2027
Produce 50lb Batches of PAX-52	2	2023	3	2023
Delta EMQB of EBAD bulk PAX-52	4	2023	4	2024
Produce and LAP 1500 M112-like Blocks	4	2024	4	2024
Design Verification Testing (DVT) & Insensitive Munitions (IM) Testing	3	2025	1	2026
M112 ECP	1	2026	3	2026
Contract Award	1	2026	1	2027
M82 CH-6 Booster Replacement	1	2017	3	2022

**UNCLASSIFIED**

**Exhibit R-4A, RDT&E Schedule Details:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER2 / <i>Close Combat Technology</i>
--	---	--

Events	Start		End	
	Quarter	Year	Quarter	Year
Baseline Testing and Dented Testing on the CH-6	1	2022	4	2022
Booster Engineering Tests of BPXN-5	1	2023	3	2023
Booster Burster Qualification	4	2023	4	2023
Update Technical Data Packages (TDPs)	4	2023	1	2024
M18 Smoke Grenade Dye	1	2021	1	2023
Prototype Testing	4	2021	2	2023
Production Decision	3	2023	3	2023
Synthetic Process TDP	3	2023	3	2023

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs				<b>Project (Number/Name)</b> ER5 / Indirect Fire and Fuze Technology			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
ER5: Indirect Fire and Fuze Technology	-	2.576	2.454	2.225	-	2.225	2.301	2.303	2.328	2.353	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 are fielded and/or 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 the 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) 2024 funding will support Fuze Technology Integration (FTI) efforts to complete the M783 mortar fuze evaluation, design improvement and testing to preclude early fuze functioning; expand and refine the fuze critical components database to identify and mitigate obsolescence; continue to mature extended duration artillery fuze power sources; develop and evaluate M734A1 mortar fuze custom application specific integrated circuit (ASIC) signal processors and accelerometers; integrate electronic and energetic technologies into the M213 hand grenade fuze to increase fuze and explosive safety; evaluate miniature reserve cell batteries for use in 30mm to 40mm medium caliber fuzes; and complete improvements to proximity fuze sensor hardware in the loop testing infrastructure; and update mortar fuze flow controller tester components.

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

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<b>Title:</b> Fuze Technology Integration (FTI)	2.576	2.364	2.225
<b>Description:</b> 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. The analysis and risk mitigation 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.			
<b>FY 2023 Plans:</b> 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;			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER5 / <i>Indirect Fire and Fuze Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>and develop and evaluate M734A1 mortar fuze custom application specific integrated circuit (ASIC) signal processor and accelerometer.</p> <p>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.</p> <p><b>FY 2024 Plans:</b> Analysis/Risk Mitigation: Complete M783 mortar fuze evaluation, design improvement and testing to preclude early fuze functioning; continue to expand and refine the fuze critical components database to identify and mitigate obsolescence and single point components &amp; processes; and continue integrating electronic and energetic technologies into the M213 hand grenade fuze to increase fuze and explosive safety. Block Upgrade: Continue maturing extended duration artillery fuze power sources; evaluate miniature reserve cell batteries for use in 30mm to 40mm medium caliber fuzes; and complete update of the proximity fuze sensor hardware in the loop testing infrastructure.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Decrease in funding in FY 2024 as a result of previously completed FTI efforts.</p>				
<p><b>Title:</b> SBIR/STTR Transfer</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC §638</p> <p><b>FY 2023 Plans:</b> Funding transferred in accordance with Title 15 USC 638</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC 638</p>		-	0.090	-
<b>Accomplishments/Planned Programs Subtotals</b>		2.576	2.454	2.225
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
Fuze Technology Integration (FTI) will improve current production munitions by exploiting available fuzing technologies and integrating these technologies into currently fielded and/ or in production fuzes to provide safer, more producible, and more lethal fuzing solutions. FTI develops second source suppliers and resolves component				

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army	<b>Date:</b> March 2023
--	-------------------------

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER5 / <i>Indirect Fire and Fuze Technology</i>
--	---	--

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 fuze production. 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.

**UNCLASSIFIED**

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army												Date: March 2023				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 7				PE 0607131A / Weapons and Munitions Product Improvement Programs				ER5 / Indirect Fire and Fuze Technology								
<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SBIR/STTR Transfer	TBD	Various : Various	-	-		0.090		-		-		-	0.000	0.090	-	
<b>Subtotal</b>			-	-		0.090		-		-		-	0.000	0.090	N/A	
<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Fuze Technology Integration Development	MIPR	DoD Ordnance Technology Consortium (DOTC) : Various	6.346	0.836	Nov 2021	1.396	Nov 2022	1.125	Nov 2023	-		1.125	0.000	9.703	-	
<b>Subtotal</b>			6.346	0.836		1.396		1.125		-		1.125	0.000	9.703	N/A	
<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Fuze Technology Integration Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (DEVCOM AC) : Picatinny Arsenal, NJ	5.226	1.740	Nov 2021	0.918	Nov 2022	1.050	Nov 2023	-		1.050	0.000	8.934	-	
<b>Subtotal</b>			5.226	1.740		0.918		1.050		-		1.050	0.000	8.934	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Fuze Technology Integration Ballistic Testing	MIPR	Army Test and Evaluation Command (ATEC) :	0.100	-		0.050	May 2023	0.050	May 2024	-		0.050	0.000	0.200	-	



**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER5 / Indirect Fire and Fuze Technology

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Fuze Technology Integration</b>																												
MEMS G-Switch Producibility Improvements																												
Mortar Fuze Microcontroller Replacement																												
Hand Grenade Fuze Improvements																												
M739A1 Delay Mode Enhancements																												
Long Range Precision Fires Artillery Fuze Compatibility																												
M783 Mortar Training Fuze Project Improvement																												
Alternate Suppliers for Critical Fuzing Components																												
Extended Range Gun Fired Fuzing Power Sources																												
Mortar Prox Fuze Product Improvements																												
Hand Grenade Safety Improvements																												
Medium Caliber Miniature Power Sources																												
Tracking Prox Technology Insertion																												

**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER5 / Indirect Fire and Fuze Technology

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
M739A1/M782 Artillery Fuze Setback Mass Improvements																												
M782 Artillery Electronic Safe and Arm																												
Proximity Fuze Sensor Hardware in the Loop Testing Infra...																												
Mortar Fuze Flow Controller																												

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER5 / <i>Indirect Fire and Fuze Technology</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Fuze Technology Integration	1	2017	4	2029
MEMS G-Switch Producibility Improvements	1	2019	3	2023
Mortar Fuze Microcontroller Replacement	1	2021	4	2024
Hand Grenade Fuze Improvements	1	2021	4	2023
M739A1 Delay Mode Enhancements	1	2020	4	2023
Long Range Precision Fires Artillery Fuze Compatibility	1	2022	2	2024
M783 Mortar Training Fuze Project Improvement	1	2022	4	2025
Alternate Suppliers for Critical Fuzing Components	1	2022	4	2029
Extended Range Gun Fired Fuzing Power Sources	1	2023	4	2026
Mortar Prox Fuze Product Improvements	1	2024	4	2029
Hand Grenade Safety Improvements	1	2023	4	2026
Medium Caliber Miniature Power Sources	1	2024	4	2028
Tracking Prox Technology Insertion	1	2026	4	2029
M739A1/M782 Artillery Fuze Setback Mass Improvements	1	2023	4	2024
M782 Artillery Electronic Safe and Arm	1	2026	4	2029
Proximity Fuze Sensor Hardware in the Loop Testing Infrastructure	1	2024	4	2025
Mortar Fuze Flow Controller	1	2023	4	2024

**UNCLASSIFIED**

**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Army **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER6 / Direct Fire Technology
--	--	--

COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
ER6: Direct Fire Technology	-	24.443	49.413	2.062	-	2.062	-	-	-	-	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) 2024 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. 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 2022	FY 2023	FY 2024
<p><b>Title:</b> Small Caliber Ammunition Product Improvements</p> <p><b>Description:</b> 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.</p> <p><b>FY 2023 Plans:</b>                      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.                      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.</p> <p><b>FY 2024 Plans:</b>                      FY 2024 request will support development efforts for lightweight case .50 Caliber variant, continue material assessment, continue finalizing design, procure qualification sample, conduct qualification test.</p>	4.407	5.179	1.062

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER6 / <i>Direct Fire Technology</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>FY 2024 request will support an interim metallic solution development effort while developing the polymer case solution for lightweight case 7.62mm ammunition variant. FY 2024 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.</p> <p>FY 2024 request will support completing pre-production qualification testing (PPQT) for 7.62mm green primer, completing Energetic Qualification (EMQB) and initiate prototype machine design.</p> <p>FY 2024 request will support improved dispersion and lethality for precision sniper ammunition particularly M1158.</p> <p>FY 2024 request will support testing to field handgun improvements such as Enhanced Ball Round (EBR) and Breeching capability.</p> <p>FY 2024 request will continue to support 7.62mm M118LRA1 which improves sniper lethality.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding decrease as lightweight case solutions are down selected.</p>				
<p><b>Title:</b> Medium Caliber Ammunition Product Improvements</p> <p><b>Description:</b> 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.</p> <p><b>FY 2023 Plans:</b> 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.</p> <p><b>FY 2024 Plans:</b> FY 2024 funding supports continuing various 20mm, 30mm, 40mm ammunition improvement efforts, such as investigating safety, performance, reliability issues, and reducing barrel wear. 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.</p>		1.033	0.500	0.500
<p><b>Title:</b> Tank Ammunition Product Improvements</p>		1.003	0.500	0.500

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER6 / <i>Direct Fire Technology</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p><b>Description:</b> Develop and test potential improvements to 105mm and 120mm gun system ammunition.</p> <p><b>FY 2023 Plans:</b> 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.</p> <p><b>FY 2024 Plans:</b> FY 2024 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.</p>			
<p><b>Title:</b> Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</p> <p><b>Description:</b> Funding transferred in accordance with Title 15 USC §638</p> <p><b>FY 2023 Plans:</b> Funding transferred in accordance with Title 15 USC §638</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> Funding transferred in accordance with Title 15 USC §638</p>	-	0.234	-
<b>Accomplishments/Planned Programs Subtotals</b>	6.443	6.413	2.062

	<b>FY 2022</b>	<b>FY 2023</b>
<p><b>Congressional Add:</b> Tungsten Manufacturing Affordability Initiative for Armaments</p> <p><b>FY 2022 Accomplishments:</b> 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 manufacturing source for industry to produce components for military applications. Perform assessment of deliverables and manufacturing readiness assessments.</p>	8.000	-
<p><b>Congressional Add:</b> Printed Electronics (PEEMS)</p>	5.000	-

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023	
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER6 / <i>Direct Fire Technology</i>	
		<b>FY 2022</b>	<b>FY 2023</b>
<b>FY 2022 Accomplishments:</b> 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.			
<b>Congressional Add:</b> Lightweight Case for Small Caliber Ammunition (LSCA)		5.000	-
<b>FY 2022 Accomplishments:</b> 7.62mm polymer case ammunition delivery and testing .50 Caliber polymer adhesive case study Tested .50 cal LCSA at U.S. Army Test and Evaluation Command in conjunction with USMC.			
<b>Congressional Add:</b> Smart Manufacturing for Armaments		-	5.000
<b>FY 2023 Plans:</b> Development of Automated Manufacturing and Inspection Processing Solutions Automated Inspection Processes for GOCO Data & Image Processing for Munition Inspection Robotic Integration into Manufacturing Process			
<b>Congressional Add:</b> Additive Manufacturing for Weapons and Armaments Components		-	10.000
<b>FY 2023 Plans:</b> Exchange best practices with the organic industrial base and manufacturing industrial base (OIB/MIB) for a Robust US Manufacturing ecosystem. Multiple contracts to advance armaments systems lethality, range, and readiness. Assess components & systems produced for operational effectiveness in extreme environments. Expand the ability to produce munitions on agile production line(s) that can be assessed for "distributed manufacturing models". Assess Stratasy's "Data Security Platform" that is supporting U.S. Government Implementations of 3D Printing.			
<b>Congressional Add:</b> Refractory Metal Alloys for Hypersonics		-	10.000
<b>FY 2023 Plans:</b> Development of refractory metal materials and manufacturing processing solutions. Advanced materials development & prototyping.			
<b>Congressional Add:</b> Proof of Concept Military-Grade Antimony Trisulfide		-	10.000

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER6 / <i>Direct Fire Technology</i>

	FY 2022	FY 2023
<b>FY 2023 Plans:</b> Using modern extraction and purification technologies design and demonstrate a line layout at a pilot scale to produce natural or synthetic stibnite that complies with MIL-A-159.		
<b>Congressional Add:</b> Next Generation Carbide Ammunition <b>FY 2023 Plans:</b> Expand of tungsten carbide manufacturing cells for ammunition: Facilities and equipment planning; Process tooling design & fabrication; Automation integration. Assess carbide prototypes.	-	8.000
<b>Congressional Adds Subtotals</b>	18.000	43.000

**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 are full and open competition.

**UNCLASSIFIED**

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army												Date: March 2023			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 0607131A / Weapons and Munitions Product Improvement Programs				ER6 / Direct Fire Technology							
Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FY23 SBIR/STTR	TBD	Various : Various	-	-		0.234		-		-		-	0.000	0.234	-
<b>Subtotal</b>			-	-		0.234		-		-		-	0.000	0.234	N/A
Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Lightweight Case Ammunition - Polymer 1	C/FFP	TBD : TBD	3.000	1.000	Jun 2023	-		-		-		-	Continuing	Continuing	Continuing
Lightweight Case Ammunition - Polymer 2	C/FFP	TBD : TBD	-	1.000	Jun 2023	-		-		-		-	0.000	1.000	-
Lightweight Case Ammunition	C/FFP	TBD : TBD	-	1.580	Feb 2023	1.900	Mar 2023	-		-		-	0.000	3.480	-
M118LRA1 - Contract 1	C/FFP	Vista : Anoka, Minnesota	0.730	0.565	Oct 2021	-		-		-		-	0.000	1.295	-
M118LRA1 - Contract 2	C/FFP	TBD : TBD	-	-		0.675	Mar 2023	-		-		-	Continuing	Continuing	Continuing
Tungsten Manufacturing - Contract	C/FFP	Insitech : Warren, New Jersey	-	7.450	Nov 2022	-		-		-		-	0.000	7.450	-
Printed Electronics PEEMS - Contract	SS/FFP	Nextflex Manufacturing Innovation Institute : Landing, New Jersey	-	3.252	Sep 2022	-		-		-		-	0.000	3.252	-
Smart Manufacturing for Armaments Contract	C/FFP	TBD : TBD	-	-		4.500	Jun 2023	-		-		-	0.000	4.500	-
Refractory Metal Alloys for Hypersonics Manufacturing contract	C/FFP	TBD : TBD	-	-		8.500	Jun 2023	-		-		-	0.000	8.500	-
Refractory Metal Alloys for Hypersonics Prototyping contract	C/FFP	TBD : TBD	-	-		0.500	Jun 2023	-		-		-	0.000	0.500	-
Antimony Sulfide proof of concept contract	C/CPFF	TBD : TBD	-	-		8.000	May 2023	-		-		-	0.000	8.000	-

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / Weapons and Munitions Product Improvement Programs	<b>Project (Number/Name)</b> ER6 / Direct Fire Technology
--	--	--

<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Next Generation Ammunition carbide manufacturing contract	C/FFP	TBD : TBD	-	-		6.700	Jun 2023	-		-		-	0.000	6.700	-
Next Generation Ammunition carbide assessment contract	C/FFP	TBD : TBD	-	-		0.500	Jun 2023	-		-		-	0.000	0.500	-
Additive Manufacturing - Contract	C/FFP	TBD : TBD	-	-		3.998	Jun 2023	-		-		-	0.000	3.998	-
<b>Subtotal</b>			3.730	14.847		35.273		-		-		-	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support - Small, Medium & Large Caliber	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	12.153	2.900	Nov 2021	1.666	Nov 2022	0.803	Nov 2023	-		0.803	Continuing	Continuing	Continuing
Engineering Support - Tungsten Manufacturing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	0.550	Aug 2022	-		-		-		-	0.000	0.550	-
Engineering Support - Printed Electronics PEEMS	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	1.748	Aug 2022	-		-		-		-	0.000	1.748	-
Engineering Support - Lightweight Case Ammunition Polymer	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	0.800	Oct 2022	-		-		-		-	0.000	0.800	-
Engineering Support - Lightweight Case Ammunition Polymer Navy	MIPR	Naval Surface Warfare Center : Picatinny Arsenal, New Jersey	-	0.950	Nov 2022	-		-		-		-	0.000	0.950	-

**UNCLASSIFIED**

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army												Date: March 2023			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 0607131A / Weapons and Munitions Product Improvement Programs				ER6 / Direct Fire Technology							
Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support - Antimony Sulfide	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	-		2.000	May 2023	-		-		-	0.000	2.000	-
Engineering Support - Next Generation Ammunition	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.800	Jun 2023	-		-		-	0.000	0.800	-
Engineering Support - Metal Alloys for Hypersonics	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	-		1.000	Jun 2023	-		-		-	0.000	1.000	-
Engineering Support - Smart Manufacturing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	-		0.500	Jun 2023	-		-		-	0.000	0.500	-
Engineering Support - Additive Manufacturing	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, New Jersey	-	-		6.002	Jun 2023	-		-		-	0.000	6.002	-
<b>Subtotal</b>			12.153	6.948		11.968		0.803		-		0.803	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
ARL Test Support Small Medium & Large Caliber	MIPR	Army Research Lab (ARL) : Aberdeen, Maryland	3.325	1.298	Feb 2022	1.700	Mar 2023	0.603	Mar 2024	-		0.603	Continuing	Continuing	Continuing
ATC Test Support Small Medium & Large Caliber	MIPR	Aberdeen Test Center (ATC) : Aberdeen, Maryland	3.998	0.100	Jun 2022	-		0.656	Mar 2024	-		0.656	Continuing	Continuing	Continuing



**UNCLASSIFIED**

<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2024 Army</b>		<b>Date: March 2023</b>
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER6 / <i>Direct Fire Technology</i>

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
Small Caliber Ammunition Product Improvements																												
<i>Small Caliber Ammunition Product Improvements</i>																												
Medium Caliber Ammunition Product Improvements																												
<i>Medium Caliber Ammunition Product Improvements</i>																												
Tank Ammunition Product Improvements																												
<i>Tank Ammunition Product Improvements</i>																												

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Army		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0607131A / <i>Weapons and Munitions Product Improvement Programs</i>	<b>Project (Number/Name)</b> ER6 / <i>Direct Fire Technology</i>

Schedule Details

Events	Start		End	
	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