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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	106.881	73.844	64.669	-	64.669	78.962	101.511	104.969	105.985	Continuing	Continuing
694: <i>Medium Caliber Ammunition</i>	-	12.000	-	-	-	-	-	-	-	-	0.000	12.000
BQ4: <i>155mm Artillery Propulsion XM654</i>	-	15.131	-	-	-	-	-	-	-	-	0.000	15.131
CD8: <i>Long Range Precision Munition (LRPM)</i>	-	-	23.288	26.365	-	26.365	44.616	50.636	60.660	61.250	0.000	266.815
EB9: <i>Aviation Airborne Expendable Countermeasures</i>	-	4.332	5.529	-	-	-	-	-	-	-	0.000	9.861
EC3: <i>Ammunition Logistics Prototyping</i>	-	1.650	2.141	1.839	-	1.839	1.884	1.920	1.920	1.938	0.000	13.292
FA5: <i>Assured Precision Weapons and Munitions</i>	-	35.302	42.886	36.465	-	36.465	32.462	48.955	42.389	42.797	Continuing	Continuing
FG1: <i>Cannon-Delivered Area Effects Munitions (C-DAEM)</i>	-	38.466	-	-	-	-	-	-	-	-	0.000	38.466

A. Mission Description and Budget Item Justification

A portion of this funding line is directly aligned to each Future Vertical Lift (FVL) and Assured Positioning, Navigation, & Timing (APNT) Army Modernization Priorities. The Tank and Medium Caliber Ammunition Program Element encompasses a comprehensive program to develop, rapidly transition to production, and field advanced weapons and munitions for small, medium and large caliber munitions, tank ammunition, mortar ammunition, cannon artillery ammunition, and close combat system items. These Projects will ensure continued battlefield overmatch and lethality of United States maneuver forces against the full range of modern battlefield threats. To achieve this, Tank and Medium Caliber Ammunition projects will identify and develop promising technologies through competitive development and streamlined acquisition procedures.

Project 694 Medium Caliber Ammunition supports development of a 30 millimeter (mm) Multi-Mode Proximity Airburst (MMPA) munition and a Closed Loop Guided Munition System capable of defeating materiel, personnel, and Unmanned Aerial Systems (UAS) threats. Multi-Mode Proximity Airburst (MMPA) supports the Maneuver Short Range Air Defense (MSHORAD) directed requirement and is endorsed by the Air and Missile Defense Cross Functional Team (AMD CFT). The Guided Munition will support current and future ground platform with a 30mm weapon systems. These efforts will miniaturize and mature critical technologies in preparation to enter Engineering & Manufacturing Development (EMD). Critical technologies include airburst fuzing, guidance and navigation, communication with fire control, and advanced lethality.

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	
<p>Project BQ4 155mm Artillery Propulsion: Supercharge is a stand-alone top-zone 155 millimeter (mm) propelling charge required to achieve maximum range requirements from the Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). Supercharge will achieve lethality overmatch out to 70 kilometers (km) with developmental extended range projectiles, and will potentially increase range with compatible legacy projectiles up to thirty percent. Supercharge is composed of an earlier bag variant and later combustible cartridge case, integral metal stub case, electrically initiated primer, and advanced artillery propellant. There is no FY 2023 budget request.</p> <p>Project CD8 - Army Aviation long range munition dominance and asymmetric advantage has eroded in recent years with peer adversaries expanding their capabilities by developing and fielding advanced systems designed to create physical stand-off especially in the realm of Anti-Access Area Denial (A2AD) and Integrated Air Defense Systems (IADS). Having operated in relatively uncontested environments for a number of years, the Joint Force has not kept pace with these peer and near peer developments and U.S. dominance is no longer assured. Army Aviation requires a Long Range Precision Munition (LRPM) that is integrated with the firing platform that can provide leap ahead capability in the penetration and dis-integration phases of Joint All Domain Operations (JADO). LRPM will provide Army Aviation with an improved long range munition system that can rapidly respond in a combat environment in order to improve the survivability of Warfighters and weapon systems, including aviation platforms in an A2AD and positioning, navigation, and timing (PNT) denied environment. The ability to interoperate and coordinate with other weapon systems and munitions at long ranges and adapt to changing threats is a core concept of the Army Aviation Weapons, Sub-Systems, and Munitions Initial Capability Document validated in July 2018, as well as the Future Attack Reconnaissance Aircraft Abbreviated Capabilities Development Document (FARA A-CDD) dated 03 June 2021. LRPM plans to leverage a capability demonstration and modular open system architecture to facilitate a reduction of costs and rapid development as threats continue to evolve.</p> <p>Project EB9 - Project EB9 Aviation Airborne Expendable Countermeasure (AAECM) supports the advanced development activities and technology demonstrations of the AAECM to include the XM215 Flare and XM20 Radio Frequency (RF) expendables. These expendable countermeasures systems are essential parts for Army aircraft and will be employed with currently fielded countermeasures as a cocktail to provide protection against all threats. Army Research Development Technology & Evaluation (RDT&E) efforts are coordinated with Program Executive Office (PEO) Aviation to address the AAECM capability, a critical Aircraft Survivability Equipment (ASE) enabler for enduring aircraft and the Future Vertical Lift (FVL) Cross Functional Team (CFT) within the Army's top modernization priorities.</p> <p>These advanced decoys will address deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. This program will evaluate integrated technologies and countermeasure prototype systems in realistic operating test environments. Prototypes will demonstrate component and subsystem maturity prior to integration into major Army aircraft platforms.</p> <p>Project EC3 Ammunition Logistics Prototyping: This Project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This Project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. Fiscal Year (FY) 2023 funding will be used to further</p>		

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	
<p>mature munition health monitoring devices in accordance with the needs of the relevant PMs. However, the preponderance of the funding will be used to directly to support Long Range Precision Fire (LRPF) munition health monitoring requirements throughout its resupply process. Specifically, the funding will be used to address munition health monitoring and packaging/preservation of munitions within the tactical movement of large caliber ammunition.</p> <p>Project FA5 - FA5 Project is focused on advanced risk mitigation, technology integration, prototyping, and product support to identify, evaluate, mature, test, and demonstrate various assured precision prototype technologies in weapon and munitions components and subsystems within a complex system-of-systems (SoS) environment. The APWM Project reinforces the National Defense Strategy's major lines of effort through technology development and prototyping, which increases lethality and ensures future combat overmatch success of the Joint Force against peer/near-peer adversaries. This project also aims to improve program performance and affordability for multiple weapons and munitions Programs of Record (PoRs) via Joint Lethality Positioning, Navigation and Timing (PNT) and Army M-Code Global Positioning System (GPS) coordinated efforts. The APWM Project directly supports top Army Modernization Priorities via the Assured- PNT (A-PNT) and Long Range Precision Fires (LRPF) Cross Functional Team (CFT) imperatives in support of the National Defense Strategy and multiple Public Law related Congressional imperatives. Funding will support engagement by weapons and munitions PNT experts in the development, evaluation, and technology delivery activities of the US Space Force's M-Code GPS, Army's PNT related programs, and A-PNT/Space CFT programs in support of LRPF and Counter Anti-Access/Area Denial (A2/AD) missions. Funding will also enable component and subsystem architecture input essential for Precision Weapons and Munitions (PW&M) operating in a Navigation Warfare (NavWar) SoS environment, Army M-Code GPS technology integration and evaluation, planning and evaluating next generation M-Code GPS to validate capability for future Joint precision munitions, and maturation of alternative PNT and NavWar related technologies and solutions to enable Resilient and Survivable PNT as well as making informed A-PNT related PoR milestone and Army cross-functional modernization decisions.</p> <p>Project FG1 - Cannon-Delivered Area Effects Munitions (C-DAEM) Project will provide United States (U.S). ground forces with the capability to engage area personnel through armored targets, while denying threat forces full operational freedom within the targeted area. An Analysis of Alternatives (AoA) was completed in January 2018 to inform Army acquisition and investment decisions regarding replacement of the current stockpile of 155 millimeter (mm) Dual Purpose Improved Conventional Munitions (DPICM) with Department of Defense (DoD) policy compliant munitions and address anti-armor and extended range capability requirements. The Army validated two materiel solutions for C-DAEM to be pursued in parallel. C-DAEM Armor (Increment 1) will destroy moved and moving infantry fighting vehicles, self-propelled howitzers, and tanks. C-DAEM DPICM Replacement (Increment 2) will destroy personnel to light-skinned vehicles. This Project does not have a Fiscal Year (FY) 2023 budget request.</p>		

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>
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B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	100.367	79.873	0.000	-	0.000
Current President's Budget	106.881	73.844	64.669	-	64.669
Total Adjustments	6.514	-6.029	64.669	-	64.669
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-5.910			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	6.514	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	64.669	-	64.669
• FFRDC Transfer	-	-0.119	-	-	-

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

Project: 694: *Medium Caliber Ammunition*

Congressional Add: *Development of Guided / Proximity Airburst Munition*

	FY 2021	FY 2022
Congressional Add Subtotals for Project: 694	12.000	-
Congressional Add Totals for all Projects	12.000	-

Change Summary Explanation

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

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) 694 / Medium Caliber Ammunition
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
694: Medium Caliber Ammunition	-	12.000	-	-	-	-	-	-	-	-	0.000	12.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 694 Medium Caliber Ammunition supports development of a 30 millimeter (mm) Multi-Mode Proximity Airburst (MMPA) munition and a Closed Loop Guided Munition System capable of defeating materiel, personnel, and Unmanned Aerial Systems (UAS) threats. Multi-Mode Proximity Airburst (MMPA) supports the Maneuver Short Range Air Defense (MSHORAD) directed requirement and is endorsed by the Air and Missile Defense Cross Functional Team (AMD CFT). The Guided Munition will support current and future ground platform with a 30mm weapon systems. These efforts will miniaturize and mature critical technologies in preparation to enter Engineering & Manufacturing Development (EMD). Critical technologies include airburst fuzing, guidance and navigation, communication with fire control, and advanced lethality.

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

	FY 2021	FY 2022
Congressional Add: Development of Guided / Proximity Airburst Munition	12.000	-
FY 2021 Accomplishments: Design, development, and maturation critical technologies that will conclude with a prototype demonstration.		
Congressional Adds Subtotals	12.000	-

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

N/A

Remarks

D. Acquisition Strategy

Other Transaction Agreement (OTA) contracts will be utilized for development, maturation and prototyping of critical fuzing and guidance technologies.

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) 694 / <i>Medium Caliber Ammunition</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Technology Maturation and Risk Reduction (TMRR)	[Redacted]																											
Engineering & Prototype Hardware Award	[Redacted]																											
Ammo Design Engineering Test 1 (DET)	[Redacted]																											
Ammo Design Engineering Test 2 (DET)	[Redacted]																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) 694 / <i>Medium Caliber Ammunition</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology Maturation and Risk Reduction (TMRR)	2	2021	2	2022
Engineering & Prototype Hardware Award	2	2021	2	2021
Ammo Design Engineering Test 1 (DET)	4	2021	1	2022
Ammo Design Engineering Test 2 (DET)	3	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) BQ4 / 155mm Artillery Propulsion XM654
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
BQ4: 155mm Artillery Propulsion XM654	-	15.131	-	-	-	-	-	-	-	-	0.000	15.131
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Supercharge is a stand-alone top-zone 155 millimeter (mm) propelling charge required to achieve maximum range requirements from the Extended Range Cannon Artillery (ERCA) Self-Propelled Howitzer (SPH). Supercharge will achieve lethality overmatch out to 70 kilometers (km) with developmental extended range projectiles, and will potentially increase range with compatible legacy projectiles up to thirty percent. Supercharge is composed of an earlier bag variant and later combustible cartridge case, integral metal stub case, electrically initiated primer, and advanced artillery propellant. There is no FY 2023 budget request.

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

	FY 2021	FY 2022	FY 2023
Title: 155mm Artillery Propulsion Supercharge	15.131	-	-
Description: The top-zone propelling charge for XM907E2 Extended Range Cannon with Slide-block breech for use with Extended Range Cannon Artillery (ERCA) to gain range overmatch for 155mm artillery.			
Accomplishments/Planned Programs Subtotals	15.131	-	-

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
• BQ3: 155mm Artillery Propulsion XM654	-	29.803	26.485	-	26.485	15.217	-	-	-	0.000	71.505

Remarks

In FY 2022, this Project will transition to Budget Activity 05, Program Element (PE) 0604802A Weapons and Munitions - Eng Dev Project BQ3 155mm Artillery Propulsion XM654. A Procurement of Ammunition, Army (PAA) funding line, Standard Study Number E99350, was established for transition to procurement FY 2022.

D. Acquisition Strategy

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

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) BQ4 / <i>155mm Artillery Propulsion XM654</i>
<p>The UMR Supercharge will utilize several competitively awarded Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) Initiatives for the maturation and integration of components. These contracts will execute UMR Supercharge through qualification testing as well as transition to procurement of quantities required for FY 2023 Safety Release for First Unit Issued (FUI) of ERCA to perform Operational Assessment. Federal Acquisition Regulation (FAR) based production contract(s) will be awarded for UMR quantities.</p> <p>The FMR Supercharge will also utilize several competitively awarded DOTC OTA Initiatives for design risk reduction of the various new and existing Supercharge components, system integration, developmental testing and qualification. Propulsion risk reduction activities will be applied to address UMR Supercharge temperature sensitivity, energy, tube wear, rough handling robustness and muzzle pressure/ blast overpressure. FAR based production contract(s) will be awarded.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) BQ4 / 155mm Artillery Propulsion XM654
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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.042	0.008	Oct 2020	-		-		-		-	0.000	0.050	-
Subtotal			0.042	0.008		-		-		-		-	0.000	0.050	N/A

Remarks
Program Management reflects Supercharge travel and milestone documentation support.

Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Combustible Cartridge Cases	MIPR	DoD Ordnance Technology Consortium (DOTC) / Armtec : Coachella, California	0.840	3.651	Nov 2020	-		-		-		-	0.000	4.491	-
Load Assemble & Pack	MIPR	DoD Ordnance Technology Consortium (DOTC) / General Dynamics-Ordnance and Tactical Systems St. Petersburg : St. Petersburg, Florida	0.173	1.058	Nov 2020	-		-		-		-	0.000	1.231	-
Propellant	MIPR	DoD Ordnance Technology Consortium (DOTC) / General Dynamics-Ordnance and Tactical Systems Valleyfield : Salaberry-de-	2.724	2.454	Mar 2021	-		-		-		-	0.000	5.178	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) BQ4 / 155mm Artillery Propulsion XM654
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
		Valleyfield, QC, Canada													
Developmental Projectile/ Fuze Hardware	MIPR	Cornerstone / General Dynamics- Ordnance and Tactical Systems Wilkes-Barre : Wilkes-Barre, Pennsylvania	-	1.316	Mar 2021	-		-		-		-	0.000	1.316	-
Developmental Projectile/ Fuze Hardware	Reqn	American Ordnance LLC : Middletown, Iowa	-	0.006	Mar 2021	-		-		-		-	0.000	0.006	-
Software Engineering	Reqn	Leidos, Inc : Reston, Virginia	-	1.226	Sep 2021	-		-		-		-	0.000	1.226	-
Subtotal			3.737	9.711		-		-		-		-	0.000	13.448	N/A

Remarks
FY 2021 increase to support prototype maturation of two Supercharge variants to support Army modernization requirements to achieve lethality at 70 kilometers (km) with precision accuracy by FY 2023.

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	1.295	3.884	Nov 2020	-		-		-		-	0.000	5.179	-
Subtotal			1.295	3.884		-		-		-		-	0.000	5.179	N/A

Remarks
Engineering support required for ongoing design risk reduction and prototype maturation efforts of two Supercharge variants.

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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) BQ4 / 155mm Artillery Propulsion XM654
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Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Supercharge Prototype Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	1.217	1.528	Mar 2021	-		-		-		-	0.000	2.745	-
Subtotal			1.217	1.528		-		-		-		-	0.000	2.745	N/A

Remarks
Additional FY 2021 testing activities required for ongoing design risk reduction and prototype maturation efforts of two Supercharge variants.

	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	6.291	15.131	-	-	-	-	0.000	21.422	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army			Date: April 2022		
Appropriation/Budget Activity 2040 / 4		R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>		Project (Number/Name) BQ4 / <i>155mm Artillery Propulsion XM654</i>	

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Supercharge 2-piece Bag (UMR Variant)																												
Prototype Development & Testing																												
Supercharge (FMR Variant)																												
Prototype Development																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) BQ4 / <i>155mm Artillery Propulsion XM654</i>

Note
Schedule reflects design risk reduction and prototype maturation efforts for two parallel Supercharge variants (2-piece bag and cased) required to support the concurrent development of the Extended Range Cannon Artillery (ERCA) Increased Range (accelerated to achieve precision accuracy at 70km range by FY 2023) and ERCA Increased Rate of Fire (with added automated loading system).

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

Events	Start		End	
	Quarter	Year	Quarter	Year
Supercharge 2-piece Bag (UMR Variant)	1	2020	3	2023
Prototype Development & Testing	2	2020	4	2021
Supercharge (FMR Variant)	1	2021	4	2021
Prototype Development	1	2021	4	2021

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Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition				Project (Number/Name) CD8 / Long Range Precision Mmunition (LRPM)			
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
CD8: Long Range Precision Mmunition (LRPM)	-	-	23.288	26.365	-	26.365	44.616	50.636	60.660	61.250	0.000	266.815
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Army Aviation long range munition dominance and asymmetric advantage has eroded in recent years with peer adversaries expanding their capabilities by developing and fielding advanced systems designed to create physical stand-off especially in the realm of Anti-Access Area Denial (A2AD) and Integrated Air Defense Systems (IADS). Having operated in relatively uncontested environments for a number of years, the Joint Force has not kept pace with these peer and near peer developments and U.S. dominance is no longer assured. Army Aviation requires a Long Range Precision Mmunition (LRPM) that is integrated with the firing platform that can provide leap ahead capability in the penetration and dis-integration phases of Joint All Domain Operations (JADO). LRPM will provide Army Aviation with an improved long range munition system that can rapidly respond in a combat environment in order to improve the survivability of Warfighters and weapon systems, including aviation platforms in an A2AD and positioning, navigation, and timing (PNT) denied environment. The ability to interoperate and coordinate with other weapon systems and munitions at long ranges and adapt to changing threats is a core concept of the Army Aviation Weapons, Sub-Systems, and Munitions Initial Capability Document validated in July 2018, as well as the Future Attack Reconnaissance Aircraft Abbreviated Capabilities Development Document (FARA A-CDD) dated 03 June 2021. LRPM plans to leverage a capability demonstration and modular open system architecture to facilitate a reduction of costs and rapid development as threats continue to evolve.

The Fiscal Year (FY) 2023 dollars in the amount of \$26.365 million will continue the review and analysis of the FY 2022 Shoot-Off Capabilities Demonstration, technology maturation and risk reduction efforts, LRPM program acquisition and contract documentation preparation and coordination, and conduct downselect activities & technical evaluations leading to a contract award to mature and qualify the LRPM System.

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

	FY 2021	FY 2022	FY 2023
Title: Long Range Precision Mmunition	-	22.438	26.365
Description: This line funds the demonstration and validation of a munition system that will engage and render desired lethal effects on targets at ranges beyond line of sight. The LRPM development effort includes demonstration and validation of precision guided munitions with the capability to complete the assigned mission in environments that could include cyber-attack, countermeasures, counter precision guided munition systems and anti-access area denial environments. These efforts will include technical assessments, concept studies, performance of risk reduction efforts, technology maturation, engineering design, engineering / manufacturing development, test, demonstration of prototype hardware, integration of LRPM, and document preparation for associated contract efforts.			
FY 2022 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) CD8 / <i>Long Range Precision Munition (LRPM)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Initiate technology maturation and risk reduction efforts including an industry capabilities demonstration. Evaluate industry concepts utilizing test scoring criteria and laboratory analysis. LRPM program acquisition and contract documentation preparation.</p> <p>FY 2023 Plans: Complete review and analysis of the FY 2022 Shoot-Off Capabilities Demonstration. Technology maturation and risk reduction efforts continue. Continue LRPM program acquisition and contract documentation preparation and coordination. Conduct down-select activities & technical evaluations leading to a contract award to mature and qualify the LRPM System.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Decrease is due to the conduct of the LRPM Shoot-Off capabilities demonstration occurring in FY 2022.</p>				
<p>Title: SBIR/STTR Transfer</p> <p>FY 2022 Plans: Funding transferred in accordance with Title 15 USC 638</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC 638</p>		-	0.850	-
Accomplishments/Planned Programs Subtotals		-	23.288	26.365
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
<p>The LRPM Program plans to explore and leverage industry's ability to deliver the LRPM solution through a Shoot-Off Capability Demonstration. Selected vendors will deliver test assets in support of a United States Government Test in 2022. This demonstration will illustrate their design concepts and technical approaches to inform the LRPM Capability Development Document (CDD). Following the LRPM Shoot-Off Capability Demonstration event, the Army plans to continue refinement, maturation, and qualification efforts for the selected weapon system. The LRPM program will prepare required acquisition and contract documentation throughout FY 2022 and FY 2023 in support of a planned contract award in FY 2023 to mature and qualify the LRPM system.</p>				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 4				PE 0603639A / Tank and Medium Caliber Ammunition				CD8 / Long Range Precision Munition (LRPM)								
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	
Systems Engineering/ Program Management	Various	Various Performers : Various	-	-		2.560	Apr 2022	3.182	Nov 2022	-		3.182	0.000	5.742	-	
Down Select / Technical Evaluations	Various	Multiple Activities : Redstone Arsenal, Alabama	-	-		-		2.046	Apr 2023	-		2.046	0.000	2.046	-	
SBIR/STTR	C/TBD	Various : Various	-	-		0.850	Apr 2022	-		-		-	0.000	0.850	-	
Subtotal			-	-		3.410		5.228		-		5.228	0.000	8.638	N/A	
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	
LRPM Other Government Agency	MIPR	CCDC Redstone Arsenal, AL : Various	-	-		-		3.231	Nov 2022	-		3.231	0.000	3.231	-	
System Development Maturation, Prototypes and Integration	C/TBD	TBD : TBD	-	-		-		14.765	Aug 2023	-		14.765	0.000	14.765	-	
Engineering and Technical Support	Various	Various : Redstone Arsenal, Alabama	-	-		-		3.141	Jan 2023	-		3.141	0.000	3.141	-	
Subtotal			-	-		-		21.137		-		21.137	0.000	21.137	N/A	
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	
Demonstration Testing	MIPR	To Be Determined : To Be Determined	-	-		14.382	Apr 2022	-		-		-	0.000	14.382	-	
LRPM Other Government Agency	MIPR	Various Performers : Various	-	-		5.496	Apr 2022	-		-		-	0.000	5.496	-	
Subtotal			-	-		19.878		-		-		-	0.000	19.878	N/A	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army								Date: April 2022				
Appropriation/Budget Activity 2040 / 4				R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>				Project (Number/Name) CD8 / <i>Long Range Precision Munition (LRPM)</i>				
	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	-	-	23.288		26.365		-		26.365	0.000	49.653	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) CD8 / <i>Long Range Precision Munition (LRPM)</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Technology Demonstration																												
Acquisition and Contract Preparation																												
Maturation, Qualification, and Testing																												
Materiel Development Decision									▲ 1																			
Production Decision																									▲ 2			

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) CD8 / <i>Long Range Precision Munition (LRPM)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology Demonstration	1	2022	1	2023
Acquisition and Contract Preparation	1	2022	3	2023
Maturation, Qualification, and Testing	4	2023	1	2027
Materiel Development Decision	2	2022	2	2022
Production Decision	1	2027	1	2027

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army										Date: April 2022		
Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition				Project (Number/Name) EB9 / Aviation Airborne Expendable Countermeasures			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EB9: Aviation Airborne Expendable Countermeasures	-	4.332	5.529	-	-	-	-	-	-	-	0.000	9.861
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

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

A. Mission Description and Budget Item Justification

Project EB9 Aviation Airborne Expendable Countermeasure (AAECM) supports the advanced development activities and technology demonstrations of the AAECM to include the XM215 Flare and XM20 Radio Frequency (RF) expendables. These expendable countermeasures systems are essential parts for Army aircraft and will be employed with currently fielded countermeasures as a cocktail to provide protection against all threats. Army Research Development Technology & Evaluation (RDT&E) efforts are coordinated with Program Executive Office (PEO) Aviation to address the AAECM capability, a critical Aircraft Survivability Equipment (ASE) enabler for enduring aircraft and the Future Vertical Lift (FVL) Cross Functional Team (CFT) within the Army's top modernization priorities.

These advanced decoys will address deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. This program will evaluate integrated technologies and countermeasure prototype systems in realistic operating test environments. Prototypes will demonstrate component and subsystem maturity prior to integration into major Army aircraft platforms.

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

	FY 2021	FY 2022	FY 2023
Title: Expendable Countermeasures to Guided Missile Threats	4.332	5.327	-
Description: This program will develop expendable countermeasure decoys which will protect Army aircraft from surface-to-air missiles.			
FY 2022 Plans: Finalize XM20 flight testing in preparation for initial operational test and evaluation to support the Milestone C decision.			
FY 2022 to FY 2023 Increase/Decrease Statement: Project EB9 / Aviation Airborne Expendable Countermeasures within PE 0603639A / Tank and Medium Caliber Ammunitions transitions to Engineering and Manufacturing Development (EMD) under Project EP7 / Aviation Airborne Expendable Countermeasures within PE 0604802A / Weapons and Munitions - Eng Dev.			
Title: FY 2022 SBIR/STTR Transfer	-	0.202	-

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army	Date: April 2022
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Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) EB9 / Aviation Airborne Expendable Countermeasures
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: Funding transferred in accordance with Title 15 USC 638			
FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC 638			
Accomplishments/Planned Programs Subtotals	4.332	5.529	-

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• EP7: Aviation Airborne Expendable Countermeasures	4.313	7.526	6.363	-	6.363	-	-	-	-	0.000	18.202
• E49101: Flare, Aircraft Countermeasure, RF (Passive)	-	-	1.036	-	1.036	-	-	-	-	0.000	1.036

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

D. Acquisition Strategy
During the Materiel Solution Analysis (MSA), Milestone A phase, prototypes developed by the US Government (USG) and contractors were tested and evaluated against initial CDD requirements. The contractor developed XM20 design and the USG developed XM215 design were selected to enter into Engineering and Manufacturing Development (EMD), Milestone B phase, to finalize the design based on lessons learned from the MSA flight test and CDD requirements. The USG starts the transition to industry via Other Transaction Authority (OTA) contract mechanism in FY 2021. Industry prototypes will undergo Developmental and Operational Testing and final XM20 and XM215 configurations to support Milestone C in FY 2022 and FY 2023 respectively.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603639A / Tank and Medium Caliber Ammunition				EB9 / Aviation Airborne Expendable Countermeasures							
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	-	-		0.202		-		-		-	0.000	0.202	-
Subtotal			-	-		0.202		-		-		-	0.000	0.202	N/A
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
XM20 Testing Hardware	C/FFP	Armtec : Lillington, NC	-	-		1.300	Apr 2022	-		-		-	0.000	1.300	-
XM20 Development	C/FFP	Armtec : Lillington, NC	2.691	-		-		-		-		-	0.000	2.691	-
XM215 Development	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	3.532	-		-		-		-		-	0.000	3.532	-
Subtotal			6.223	-		1.300		-		-		-	0.000	7.523	N/A
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
XM20 Engineering Support	MIPR	DEVCOM Armaments Center : Picatinny Arsenal, NJ	1.180	0.554	Feb 2021	0.764	Apr 2022	-		-		-	0.000	2.498	-
XM20 Contractor Support	C/FFP	Booz Allen Hamilton : Aberdeen, MD	-	0.106	Apr 2021	0.250	May 2022	-		-		-	0.000	0.356	-
XM20 Engineering Support	MIPR	DEVCOM C5ISR : Aberdeen Proving Ground, MD	0.222	-		-		-		-		-	0.000	0.222	-
Subtotal			1.402	0.660		1.014		-		-		-	0.000	3.076	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EB9 / <i>Aviation Airborne Expendable Countermeasures</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Radio Frequency (RF) Development																												
XM20 Technology Maturation and Risk Reduction	[Bar]																											
XM20 Data Analysis		[Bar]																										
XM20 Milestone B																												
XM20 Development Contract																												
XM20 Qualification Build																												
XM20 Critical Design Review																												
XM20 Developmental Testing																												
XM20 Milestone C																												
XM20 Test Hardware																												
XM20 Operational Test and Evaluation																												
XM20 Production																												
XM215 Development																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EB9 / <i>Aviation Airborne Expendable Countermeasures</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027										
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4							
XM215 Engineering and Manufacturing Development	[Redacted]																																		
	XM215 EMD																																		
XM215 Design Verification Test																																			
XM215 Flight Test																																			
XM215 Prototype Build																																			
XM215 Flight Test 2																																			
XM215 Developmental and Operational Testing																																			
XM215 Milestone C																																			
XM215 Production																																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EB9 / <i>Aviation Airborne Expendable Countermeasures</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Radio Frequency (RF) Development	1	2019	4	2025
XM20 Milestone A	1	2019	1	2019
XM20 Prototype Development	1	2019	4	2019
XM20 Demonstrations	2	2019	3	2019
XM20 Technology Maturation and Risk Reduction	1	2020	2	2021
XM20 Flight Testing	2	2020	2	2020
XM20 Modeling and Simulation	3	2020	4	2020
XM20 Data Analysis	1	2021	2	2021
XM20 Milestone B	2	2021	2	2021
XM20 Development Contract	2	2021	4	2022
XM20 Qualification Build	2	2021	3	2022
XM20 Critical Design Review	2	2022	2	2022
XM20 Developmental Testing	2	2022	4	2022
XM20 Milestone C	4	2022	4	2022
XM20 Test Hardware	4	2022	2	2023
XM20 Operational Test and Evaluation	3	2023	3	2023
XM20 Production	3	2023	2	2028
XM215 Development	1	2019	4	2025
XM215 Milestone A	1	2019	1	2019
XM215 Prototyping	1	2019	2	2020
XM215 Down Select	3	2019	3	2019
XM215 Testing Efforts (Stability/Heat/Cold)	3	2019	2	2020

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

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EB9 / <i>Aviation Airborne Expendable Countermeasures</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
XM215 Flight Testing	1	2020	2	2020
XM215 Milestone B	2	2020	2	2020
XM215 Engineering and Manufacturing Development	2	2020	4	2023
XM215 Design Verification Test	2	2021	3	2021
XM215 Flight Test	2	2021	2	2021
XM215 Prototype Build	3	2021	4	2023
XM215 Flight Test 2	1	2023	1	2023
XM215 Developmental and Operational Testing	2	2023	4	2023
XM215 Milestone C	4	2023	4	2023
XM215 Production	2	2024	2	2029

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army										Date: April 2022		
Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition				Project (Number/Name) EC3 / Ammunition Logistics Prototyping			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
EC3: Ammunition Logistics Prototyping	-	1.650	2.141	1.839	-	1.839	1.884	1.920	1.920	1.938	0.000	13.292
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This Project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. Fiscal Year (FY) 2023 funding will be used to further mature munition health monitoring devices in accordance with the needs of the relevant PMs. However, the preponderance of the funding will be used to directly to support Long Range Precision Fire (LRPF) munition health monitoring requirements throughout its resupply process. Specifically, the funding will be used to address munition health monitoring and packaging/preservation of munitions within the tactical movement of large caliber ammunition.

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

	FY 2021	FY 2022	FY 2023
Title: Munitions Health and Inventory Monitoring Systems	1.150	1.065	0.952
<p>Description: Performance and reliability of certain munitions can be degraded by the environmental exposure history they experience during their lifetime. This Project will develop simple to complex environmental health and inventory monitoring systems to improve reliability and asset visibility and enable effective Condition Based Management for Ammunition. All research and development initiatives will be supporting the Long Range Precision Fires (LRPF) & Solider Lethality (SL) Cross Functional Teams (CFTs) and the multi domain operations modernization objectives that consume, store or transport/distribute munitions and munition components in the maneuver formations.</p> <p>FY 2022 Plans: Develop technologies for monitoring the health of ammunition out of its standard depot pack after issuance from the wholesale ammunition system. Assess utility of providing actionable intelligence through use of the Tactical Ammunition Management Micro-Services (TAMMS).</p> <p>FY 2023 Plans: Develop and mature prototype systems to monitor munition exposure throughout the tactical distribution system. Develop systems to monitor large caliber projectiles, associated propellant, fuzes, and any other ammunition components as packaging</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EC3 / <i>Ammunition Logistics Prototyping</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
and transport/storage configurations evolve within the tactical distribution system. Integrate these monitoring systems with other ammunition management technologies. FY 2022 to FY 2023 Increase/Decrease Statement: Decrease due to increase in maturity level of items shifting to BA 6.5.				
Title: Munitions Containerization Systems Description: For each family of munitions containers, optimize prototype container systems for automation compatibility, combat unit load quantity, sustainability/recyclability, Insensitive Munitions/explosives safety, environmental protection, load reconfiguration, unitization, and standardized interfaces. This will improve ammunition distribution efficiency while minimizing environmental and operational impacts. FY 2022 Plans: Pending PM CAS FY 2021 approval, conduct qualification testing on new inner and outer pack propellant charge containers/ consolidators that are designed to reduce unit logistics & soldier burden and interface with increasingly automated weapon and sustainment systems, for integration with ammunition items under development by PM CAS that support legacy BCT operations. Develop LRPF munition inner packaging barrier based on environmental assessment completed in FY 2021. FY 2023 Plans: Conduct qualification testing on plastic cylindrical injection molded containers and / or inner packaging components that are low cost, lightweight and incorporate features that will enable interoperability with future automated weapon and sustainment systems, for integration with ammunition items under development by PM CAS. Complete developmental testing on inner packaging barrier prototypes designed to protect new large caliber propellant items against environmental effects. FY 2022 to FY 2023 Increase/Decrease Statement: Decrease due to increase in maturity level of items shifting to BA 6.5.		0.500	0.997	0.887
Title: SBIR/STTR Transfer FY 2022 Plans: Funding transferred in accordance with Title 15 USC 638 FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC 638		-	0.079	-
Accomplishments/Planned Programs Subtotals		1.650	2.141	1.839

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EC3 / <i>Ammunition Logistics Prototyping</i>

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

Remarks

D. Acquisition Strategy

Fiscal Year (FY) 2023 funding will be used to further mature munition health monitoring devices in accordance with the needs of the relevant PMs. However, the preponderance of the funding will be used to directly to support Long Range Precision Fire (LRPF) munition health monitoring requirements throughout its resupply process. Specifically, the funding will be used to address munition health monitoring and packaging/preservation of munitions within the tactical movement of large caliber ammunition.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
2040 / 4				PE 0603639A / Tank and Medium Caliber Ammunition					EC3 / Ammunition Logistics Prototyping						
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	-	-		0.079		-		-		-	0.000	0.079	-
Subtotal			-	-		0.079		-		-		-	0.000	0.079	N/A
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Plastic Cylindrical Container	C/FFP	SAVIT : Rockaway, NJ	0.647	-		-		-		-		-	0.000	0.647	-
Plastic Rectangular Container	C/FFP	SAVIT : Rockaway, NJ	0.505	0.051	Aug 2021	-		-		-		-	0.000	0.556	-
Advanced Munitions Health Monitoring System	C/FFP	TBD : TBD	-	-		-		0.200	Jan 2023	-		0.200	0.000	0.200	-
Tactical Munitions Health Monitoring System	C/FFP	Cybernet : Ann Arbor, MI	-	0.765	Sep 2021	0.984	Jan 2022	0.275	Jan 2022	-		0.275	0.000	2.024	-
Large Caliber Automation Friendly Packaging	TBD	TBD : TBD	-	-		-		0.500	Mar 2023	-		0.500	0.000	0.500	-
Subtotal			1.152	0.816		0.984		0.975		-		0.975	0.000	3.927	N/A
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Combat Capabilities Development Command Armaments Center (CCDC AC)	MIPR	Picatinny Arsenal : NJ	4.570	0.834	Dec 2020	0.878	Nov 2021	0.664	Nov 2021	-		0.664	0.000	6.946	-
Subtotal			4.570	0.834		0.878		0.664		-		0.664	0.000	6.946	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) EC3 / Ammunition Logistics Prototyping

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Advanced Concept Development-Munitions Containerization-1A																												
Munitions Containerization-Plastic Rectangular Container																												
Tactical Munitions Health Monitoring System																												
Tactical Munitions Health Monitoring System																												
Large Caliber Automation Friendly Packaging																												
Large Caliber Automation Friendly Packaging																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) EC3 / <i>Ammunition Logistics Prototyping</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Advanced Concept Development-Munitions Containerization-1A	1	2020	4	2021
Advanced Concept Development-Munitions Health Monitoring-3	3	2017	4	2020
Tactical Munitions Health Monitoring System	1	2022	4	2024
Large Caliber Automation Friendly Packaging	1	2023	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army										Date: April 2022		
Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition				Project (Number/Name) FA5 / Assured Precision Weapons and Munitions			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FA5: Assured Precision Weapons and Munitions	-	35.302	42.886	36.465	-	36.465	32.462	48.955	42.389	42.797	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Assured Precision Weapons and Munitions (APWM) - FA5 Project is focused on advanced risk mitigation, technology integration, prototyping, and product support to identify, evaluate, mature, test, and demonstrate various assured precision prototype technologies in weapon and munitions components and subsystems within a complex system-of-systems (SoS) environment. The APWM Project reinforces the National Defense Strategy's major lines of effort through technology development and prototyping, which increases lethality and ensures future combat overmatch success of the Joint Force against peer/near-peer adversaries. This project also aims to improve program performance and affordability for multiple weapons and munitions Programs of Record (PoRs) via Joint Lethality Positioning, Navigation and Timing (PNT) and Army M-Code Global Positioning System (GPS) coordinated efforts. The APWM Project directly supports top Army Modernization Priorities via the Assured-PNT (A-PNT) and Long Range Precision Fires (LRPF) Cross Functional Team (CFT) imperatives in support of the National Defense Strategy and multiple Public Law related Congressional imperatives. Funding will support engagement by weapons and munitions PNT experts in the development, evaluation, and technology delivery activities of the US Space Force's M-Code GPS, Army's PNT related programs, and A-PNT/Space CFT programs in support of LRPF and Counter Anti-Access/Area Denial (A2/AD) missions. Funding will also enable component and subsystem architecture input essential for Precision Weapons and Munitions (PW&M) operating in a Navigation Warfare (NavWar) SoS environment, Army M-Code GPS technology integration and evaluation, planning and evaluating next generation M-Code GPS to validate capability for future Joint precision munitions, and maturation of alternative PNT and NavWar related technologies and solutions to enable Resilient and Survivable PNT as well as making informed A-PNT related PoR milestone and Army cross-functional modernization decisions.

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

	FY 2021	FY 2022	FY 2023
Title: APWM Integrated Product Support - Joint Lethality PNT SME Working Integrated Product Team (WIPT) & Program Management	3.526	3.600	3.744
Description: Provide APWM technical subject matter expertise and support to the Joint oversight board for APWM. Provide overall APWM Project Program Management support.			
FY 2022 Plans: The Subject Matter Experts (SMEs) will continue coordinating with and supporting the development and technology delivery activities of the Joint Weapons and Munitions community, to include PNT modernization and NavWar related programs including participation in design reviews, evaluation and formal feedback on technology and systems requirements and performance, component and subsystem architecture input essential for precision weapons and munitions operating in a SoS multi-domain environment, and configuration management of the evolving Precision Guided Munition (PGM) Technical Requirements			

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Document (TRD). Specific support focus includes requirements for Military GPS User Equipment (MGUE) Increment 2 and alternative PNT technology maturity.</p> <p>FY 2023 Plans: Provides overall Project Program Management support for 643639A-FA5. The Joint Lethality SMEs will continue to provide technical expertise and support to the Joint oversight board for Assured Precision Weapons and Munitions by coordinating with and supporting the development and technology delivery activities of the Joint Weapons and Munitions community, to include PNT modernization and NavWar related programs, participation in design reviews, evaluation and formal feedback on technology and systems requirements and performance, component and subsystem architecture input essential for precision weapons and munitions operating in a Joint SoS multi-domain environment. Specific support focus includes requirements for MGUE Increment 2, resilient and survivable PNT technology maturation, and NavWar dependencies.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: A slight increase in funding due the level of effort required in FY 2023 is slightly higher than FY 2022 due to Assured Position Navigation and Timing/Space (APNT/S) Cross Functional Team (CFT) and US Space Force's MGUE program efforts, maturing NavWar initiatives, and increasing complexity of multi-domain operations (MDOs) impacting collaborative efforts for the Joint Lethality community.</p>				
<p>Title: Assured PNT related Integration Risk Mitigation - NA2 for Weapons and Munitions Phase 2</p> <p>Description: Perform NA2 systems of systems capability integration and pre system qualification integration risk reduction activities. Improve initial prototype NA2 capability and initiate improved prototype for subsequent transition to corresponding PoRs. Inform future NavWar related weapons and munitions platform dependencies. Integrate and synchronize AltNav capability delivery within NA2 to meet A-PNT CFT AltNav Directed Requirement which summarizes the urgent need for AltNav initial operational capability in two Brigade Combat Teams NLT 1QFY 2024.</p>		3.700	-	-
<p>Title: Assured PNT related Integration Risk Mitigation - NA2 for Guided Rocket/Missile Launcher Systems</p> <p>Description: Perform software development and prototyping activities to demonstrate NA2 capability for Rocket/Missile artillery launcher systems. Integrate and demonstrate upgraded artillery launcher system into the NA2 SoS networked capability to reduce subsequent PoR fielding risks. Integrate and synchronize AltNav capability delivery within NA2 to meet A-PNT/Space CFT AltNav Directed Requirements which summarizes the urgent need for AltNav IOC in two BCTs NLT 1QFY 2024.</p>		2.000	-	-
<p>Title: Fires System-of-Systems APNT related AS and Navigation Warfare (NavWar)</p> <p>Description: Prototype PNT enabling technologies that are critical for executing Fires SoS NavWar missions to include munition-based offensive, defensive, and associated Command and Control (C2) functions. Prototyping efforts will focus on enabling combat lethality overmatch in PNT challenged environments for cannon and rocket/missile core missions. Prototype long range</p>		3.786	5.000	-

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
stand-off NavWar capability to penetrate contested A2/AD environments via use of long-range artillery, Fires SoS architectures enabling advanced NavWar attack, sense, and optimization, and advanced anti-jam/anti-spoof techniques for munitions.				
<p>FY 2022 Plans: Continue maturing initial prototypes for gun-hardened NavWar systems. Conduct integration activities of a gun-hardened NavWar system prototype and execute a Live Fire Test demonstration from a 155mm artillery cargo round. A technical report will document results of the gun-launched NavWar prototype. Identify and define the future Fires SoS MDO interdependencies to enable a suite of NAVWAR operational capabilities and develop near, mid, and long term MDO Fires and NAVWAR strategies to meet Army modernization imperatives.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funds were decreased due to Fires SoS APNT related AS and NavWar prototypes providing live fire demonstrations of capabilities in FY 2022 in order to meet Army modernization imperatives. This includes Munition Deployed NavWar (MDN) prototype live fire demonstration(s) and test reports, and virtual prototype of Fires SoS NavWar capability with concept of operation and resource plan for physical prototyping.</p>				
<p>Title: Next Generation PNT Technologies Phase 1</p> <p>Description: Continue prototyping APNT technologies to provide the next generation of APNT capability to weapons and munitions in a highly complex and fast paced battlefield. Will leverage prior Army Science & Technology (S&T), previous integrated demonstration events, information on threat advancement, and lessons learned to rapidly develop, integrate, prototype, and transition critical APNT technologies to weapons and munitions directly supporting LRPF and Air & Missile Defense (AMD) initiatives.</p> <p>FY 2022 Plans: Continue to mature and improve proven APNT technology for spiral development and integration into weapons and munitions to maintain combat lethality overmatch in highly contested PNT environments.</p> <p>FY 2023 Plans: Demonstrate resilient and survivable PNT solutions for weapons and munitions using results of phase 1 spiral APNT technology solutions in complex PNT threat environments.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding increased due to FY 2023 focusing on demonstration initiatives to outpace the threat and enable LRPF in a highly complex MDOs environment requiring from phase 1 spiral of next generation PNT technologies.</p>		-	1.216	2.268
<p>Title: Assured PNT related Weapons & Munitions Prototyping - AltNav Technologies (AltNav) Phase 2</p>		3.175	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Description: Conduct rapid development and prototyping of AltNav receivers for PGMs and assess operational feedback (receivers, enterprise service, and integration) of solutions to maximize utility of AltNav for LRPF meeting the intent of paragraph 6 of the A-PNT/Space CFT AltNav Directed Requirement. Demonstrate and conduct performance assessments of potential hardware and software solutions to support Artillery integration efforts as well as inform future Space-based PNT related alternatives for the Land Combat domain.</p>				
<p>Title: Rocket/Missile Precision Guided Munition M-Code Prototyping</p> <p>Description: Directly supports M-Code public law by rapidly prototyping M-Code receivers for direct transfer to rocket/missile systems.</p> <p>FY 2022 Plans: Prototyping of Army NAVSTORM-M capability for Deep Fire Artillery PGMs.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding decreased as a result of FY 2022 being the final year of rapid NAVSTORM-M M-Code receiver prototyping for transition to PEO MS and JPEO AA. Completed PGM NavStorm-M M-Code PGM GPS receiver ready for integration across PEO MS and JPEO AA PoRs.</p>		-	6.000	-
<p>Title: Munition Deployed NavWar Countermeasures</p> <p>Description: Prototype, integrate, and experiment with initial increment of Munition Deployed NavWar Countermeasures (MDNC) and weapons and munitions System of Systems dependencies directly supporting APNT/Space CFT NavWar initiatives and LRPF initiative of penetrating, disrupting, and disintegrating Anti Access/Area Denial (A2/AD) environments to enable employment of precision weapons and munitions.</p> <p>FY 2022 Plans: Evaluate and experiment with MDN-C solutions and weapons and munitions system of systems dependencies to penetrate and disrupt enemy A2 / AD. Inform extended range cargo carrier and mid to long-term NavWar initiatives to deliver standoff countermeasure effects enabling freedom of operations and employment of precision weapons and munitions in A2/AD environments.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding was decreased in FY23 as a result of accomplishing goals in FY22 Plans.</p>		-	6.000	-
<p>Title: Assured PNT related Weapons & Munitions Prototyping - PGM Software-Defined Receiver (SDRx)</p>		-	6.000	5.329

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Description: Develop a prototype "All In One" (Global Positioning System (GPS), Global Navigation Satellite System (GNSS), Alternative Navigation (AltNav), Signals of Opportunity (SoO)) software defined radio frequency Assured Position, Navigation and Timing (A-PNT) receiver for a large portion of the Precision Guided Munition (PGM) portfolio.</p> <p>FY 2022 Plans: Develop diverse RF Basic Navigation functions required for a prototype PGM SDRx.</p> <p>FY 2023 Plans: Continue to develop diverse RF Basic Navigation functions required for a prototype PGM SDRx and initiate GPS security certification process.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: FY 2023 funding decrease due to focus on core navigation function prototype evaluation to reduce risk before adding advanced anti-jam and anti-spoof features to the receiver.</p>				
<p>Title: Army M-Code Technology Integration and Evaluation</p> <p>Description: Provide technical assessment, coordination, and engineering support related to the development, prototyping, integration, and evaluation of Air Force's MGUE technology deliverables across all Army Weapons and Munitions, including participation in design reviews, testing, evaluation, and formal feedback on technology, component-level, card-level, sub-system-level, and systems-level requirements and performance. Reduce risk, support, and inform M-Code GPS related Army cross-functional modernization decisions for weapons and munitions operating in a peer/near threat SoS environment as well as identifying complementary PNT and related solutions when M-Code GPS is not solely sufficient to enable Combat Overmatch.</p>		11.101	-	-
<p>Title: Army APNT (incl M-Code) and NavWar Technology Integration and Evaluation</p> <p>Description: Provide technical assessment, coordination, and engineering support related to the development, prototyping, integration, and evaluation of US Space Force's MGUE technology deliverables across all Army Weapons and Munitions, including participation in design reviews, testing, evaluation, and formal feedback on technology, component-level, card-level, sub-system-level, and systems-level requirements and performance. Reduce risk, support, and inform M-Code GPS related Army cross-functional modernization decisions for weapons and munitions operating in a peer/near threat SoS environment as well as identifying complementary PNT and NavWar related solutions when M-Code GPS is not solely sufficient to enable Combat Overmatch.</p> <p>FY 2022 Plans: Continue to lead the Army M-Code GPS Weapons and Munitions IPT and influence the Air Force's MGUE technology investments via established requirements and performance based needs for Army Weapons and Munitions. Lead a centralized</p>		-	12.000	12.420

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Army evaluation, prototyping, and experimentation mechanism to assess the effectiveness of M-Code GPS focused weapon and munition platform capabilities as well as emerging NavWar related capabilities operating in a peer/near PNT threat SoS environment. Continue to lead the multi-organizational IPT to execute study, analysis, integration, and migration imperatives for the Army M-Code Task Force. Support high priority Army programs transitioning to M-Code to meet Army modernization objectives.</p> <p>FY 2023 Plans: Continues to support design reviews, experimentation, prototyping, testing, evaluation, and risk reduction of Army M-Code Inc2, AltNav, and NavWar by in-house government activities and OTA/IDIQ Contract efforts. Maintains an Army APNT and NavWar Weapons and Munitions IPT working directly with the APNT/S CFT and multiple PEOs. Facilitate weapon and munition APNT and NavWar experimentation in PNT Assessment (PNTAX) and Project Convergence type events to inform CONOPS and requirement generation processes.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: FY 2023 slight funding increase due to a level of effort required in FY 2023 is slightly higher than FY 2022 due to an increase in activity from various organizations and increased participation in joint demonstrations.</p>				
<p>Title: MGUE Increment 2 (Inc2) with Precision Guidance Kit - Anti Jam (LR PGK)</p> <p>Description: Influence next generation MGUE development to ensure precision guided munition needs and requirements are met with the Air Force's next generation MGUE. Integrate and test next generation MGUE into the Long Range Precision Guidance Kit (LR-PGK) as the DoD-selected representative Joint precision munition to verify and validate needs and requirements are met by next generation MGUE.</p>		1.500	-	-
<p>Title: MGUE Inc2 for JROC-directed PGM Lead Platform</p> <p>Description: Influence next generation MGUE development to ensure precision guided munition needs and requirements are met with the US Space Force (USSF) next generation MGUE. Evaluate the next generation MGUE using the Long Range Precision Guidance Kit (LR-PGK) as the DoD-selected representative Joint precision munition to verify and validate PGM needs and requirements are met by next generation MGUE.</p> <p>FY 2022 Plans: Perform M&S on GPS threat scenarios on MGUE designs to assess performance for PGM applications. Perform risk reduction analysis and activities of MGUE vendor designs. Draft Inc2 Next Generation Application Specific Integrated Circuit (ASIC) NGA TMA & IRA Report for PGMs.</p> <p>FY 2023 Plans:</p>		-	1.500	12.704

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<p>Work directly with USSF and M-Code Inc2 GPS prime vendors to start virtually prototyping and conducting PGM application specific design trade studies to reduce risk of integration into LR PGK, as the JROC-approved selected representative PGM for next generation ASIC verification and validation ensuring PGM PNT-related needs and requirements are met by MGUE Inc2.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding will increase because the M-Code Inc2 vendors will have initial ASIC design mature enough to start virtual prototyping and design trade study analysis specific to addressing PGM requirements and needs significantly increasing the required effort from the previous year.</p>			
<p>Title: Accelerate NAVSTORM-M-Integration</p> <p>Description: The C-DAEM Armor Hit to Kill (HTK) development effort requires additional FY 2021 funding to initiate critical risk reduction activities supporting the integration of the NavStorm-M GPS Receiver into the HTK Full Materiel Release (FMR) variant. This requirement is supported by the director of the APNT/S CFT and the director of the LRPF CFT.</p>	6.514	-	-
<p>Title: SBIR/STTR</p> <p>FY 2022 Plans: Funding transferred in accordance with Title 15 USC 638</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC 638</p>	-	1.570	-
Accomplishments/Planned Programs Subtotals	35.302	42.886	36.465

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

N/A

Remarks

D. Acquisition Strategy

Acquisition Strategy: The Assured Precision Weapons and Munitions Project will utilize a combination of Other Transaction Authority (OTA) contract mechanisms such as the Defense Ordinance Technology Consortium (DOTC) OTA and In-House government development and engineering capabilities to obtain prototypes and demonstrate/evaluate the maturity and integration risk of the M-Code GPS on Precision Munitions and Weapons, as well as other alternative PNT and NavWar related capabilities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) FA5 / Assured Precision Weapons and Munitions
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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	TBD	Various : Various	-	-		1.570		-		-		-	0.000	1.570	-
Subtotal			-	-		1.570		-		-		-	0.000	1.570	N/A

Remarks
In FY 2022, funding in the amount of \$0.450 million for manpower was realigned to Operations and Maintenance. Program support costs have been accurately updated to reflect the realignments.

Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Assured PNT related Weapons Integration Risk Mitigation	MIPR	DoD Ordnance Technology Consortium (DOTC) - Various : Various	11.174	4.310	Dec 2020	-		-		-		-	0.000	15.484	-
Assured PNT related Weapons Integration Prototyping	MIPR	DoD Ordnance Technology Consortium (DOTC) - Various : Various	5.271	1.000	Dec 2020	-		-		-		-	0.000	6.271	-
Assured PNT related Munitions Integration Risk Mitigation	MIPR	DoD Ordnance Technology Consortium (DOTC) - Various : Various	9.571	2.786	Dec 2020	-		-		-		-	0.000	12.357	-
Assured PNT related Munitions Integration Prototyping	MIPR	DoD Ordnance Technology Consortium (DOTC) - Various : Various	8.611	3.175	Dec 2020	5.000	Dec 2021	2.258	Dec 2022	-		2.258	0.000	19.044	-
Army APNT (incl M-Code) and NavWar Technology Integration and Evaluation	MIPR	Various : Various	6.521	6.101	Dec 2020	7.200	Dec 2021	9.900	Dec 2022	-		9.900	Continuing	Continuing	Continuing
Weapon & Munitions Prototyping & Integration Risk Mitigation	MIPR	DoD Ordnance Technology Consortium (DOTC)	-	-		15.666	Dec 2021	3.939	Dec 2022	-		3.939	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603639A / Tank and Medium Caliber Ammunition				FA5 / Assured Precision Weapons and Munitions							
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
		- TBD; Various : Various													
MGUE Inc2 for JROC directed PGM Lead Platform Development	MIPR	DoD Ordnance Technology Consortium (DOTC) - Various : Various	-	-		-		10.017	Dec 2022	-		10.017	Continuing	Continuing	Continuing
Accelerate NAVSTORM-M-Integration	MIPR	DoD Ordnance Technology Consortium (DOTC) - Various : Various	-	6.514	Apr 2021	-		-		-		-	0.000	6.514	6.514
Subtotal			41.148	23.886		27.866		26.114		-		26.114	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Joint Program Executive Office Armaments and Ammunition (JPEO A&A) : Picatinny Arsenal, NJ	3.322	1.275	Dec 2020	1.250	Dec 2021	1.278	Dec 2022	-		1.278	Continuing	Continuing	Continuing
Assured Precision Weapons and Munitions IPT Support	MIPR	Various : Various	6.123	2.341	Dec 2020	2.400	Dec 2021	2.466	Dec 2022	-		2.466	Continuing	Continuing	Continuing
Army APNT (incl M-Code) and NavWar Technology Integration and Evaluation Support. (Multiple PEO Sup	MIPR	Various : Various	-	1.500	Dec 2020	5.200	Dec 2021	2.520	Dec 2022	-		2.520	Continuing	Continuing	Continuing
Assured Technologies Engineering Support	MIPR	DEVCOM : Picatinny Arsenal, NJ	2.696	1.100	Dec 2020	2.500	Dec 2021	1.000	Dec 2022	-		1.000	Continuing	Continuing	Continuing
Assured Technologies Engineering Support	MIPR	Communication Electronics	1.471	0.200	Dec 2020	0.400	Dec 2021	0.200	Dec 2022	-		0.200	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition	Project (Number/Name) FA5 / Assured Precision Weapons and Munitions
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Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
		Research, Development and Engineering Center (C5ISR) : Aberdeen Proving Ground, MD													
Assured Technologies Engineering Support	MIPR	Aviation and Missiles Center (AvMC) : Redstone Arsenal, AL	-	-		0.200	Dec 2021	0.200	Dec 2022	-		0.200	Continuing	Continuing	Continuing
Army M-Code Technology Integration and Evaluation Support	MIPR	Various : Various	2.421	3.500	Dec 2020	-		-		-		-	0.000	5.921	-
MGUE Inc2 for JROC-directed PGM Lead Platform Support	MIPR	Combat Capability Development Command Armament Center (CCDC AC) : Picatinny Arsenal, NJ	1.071	1.500	Dec 2020	1.500	Dec 2021	2.687	Dec 2022	-		2.687	Continuing	Continuing	Continuing
Subtotal			17.104	11.416		13.450		10.351		-		10.351	Continuing	Continuing	N/A

Remarks
Support consists of labor, travel and other non-labor costs in Fiscal Year (FY) 2022.

	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	58.252	35.302	42.886	36.465	-	36.465	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Integrated Product Support - Joint Lethality PNT SME WIPT & Pr	[Redacted]																											
W&M Proto & Integration Risk Mitigation - NA2 for Weapons & M	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - NA2 for Guided RAMS	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - Fires SoS APNT relate	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - Next Gen PNT Technologies Phase 1	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - AltNav Technologies P	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - RAMS PGM M-Code Prototyping	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - Munition Deployed NavWar CM	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - PGM Software Defined Receiver Phase 1	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
W&M Proto & Integration Risk Mitigation - PGM Software Defined Receiver Phase 2	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			
Army APNT (incl M-Code) and NavWar Technology Integration a	[Redacted]																											
MGUE Inc2 for JROC-directed PGM Lead Platform	[Redacted]																											
W&M Proto & Integration Risk Mitigation - Next Gen NavWar Tech Phase 1	[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]				[Redacted]			

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
W&M Proto & Integration Risk Mitigation - Fires SoS NavWar MDO Phase 1																												
W&M Proto & Integration Risk Mitigation - Next Gen NavWar CM Tech Phase 1																												
W&M Proto & Integration Risk Mitigation - Fires SoS NavWar MDO Phase 2																												
W&M Proto & Integration Risk Mitigation - Next Gen PNT Technologies Phase 2																												
Accelerate NAVSTORM-M-Integration																												

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

Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FA5 / <i>Assured Precision Weapons and Munitions</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Integrated Product Support - Joint Lethality PNT SME WIPT & Program Management	1	2017	4	2028
W&M Proto & Integration Risk Mitigation - APNT FASCAM Replacement	1	2019	4	2020
W&M Proto & Integration Risk Mitigation - NA2 for Weapons & Munitions Phase 2	1	2020	4	2021
W&M Proto & Integration Risk Mitigation - NA2 for Guided RAMS	1	2020	4	2021
W&M Proto & Integration Risk Mitigation - Fires SoS APNT related AS and NavWar	1	2021	4	2022
W&M Proto & Integration Risk Mitigation - Next Gen PNT Technologies Phase 1	1	2022	4	2023
W&M Proto & Integration Risk Mitigation - AltNav Technologies Phase 2	1	2020	4	2021
W&M Proto & Integration Risk Mitigation - Location Azimuth Determinations System	1	2020	4	2020
W&M Proto & Integration Risk Mitigation - RAMS PGM M-Code Prototyping	1	2022	4	2022
W&M Proto & Integration Risk Mitigation - Munition Deployed NavWar CM	1	2022	1	2023
W&M Proto & Integration Risk Mitigation ? PGM Software Defined Receiver Phase 1	1	2022	4	2023
W&M Proto & Integration Risk Mitigation ? PGM Software Defined Receiver Phase 2	1	2024	4	2025
Army APNT (incl M-Code) and NavWar Technology Integration and Evaluation	1	2020	4	2028
MGUE Inc2 for JROC-directed PGM Lead Platform	1	2020	4	2027
W&M Proto & Integration Risk Mitigation - Next Gen NavWar Tech Phase 1	1	2024	4	2025
W&M Proto & Integration Risk Mitigation - Fires SoS NavWar MDO Phase 1	1	2025	4	2026
W&M Proto & Integration Risk Mitigation - Next Gen NavWar CM Tech Phase 1	1	2027	4	2028
W&M Proto & Integration Risk Mitigation - Fires SoS NavWar MDO Phase 2	1	2027	4	2028
W&M Proto & Integration Risk Mitigation - Next Gen PNT Technologies Phase 2	1	2027	4	2028
Accelerate NAVSTORM-M-Integration	3	2021	3	2022

Note
Notes:

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
2040 / 4	PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	FA5 / <i>Assured Precision Weapons and Munitions</i>
Positioning, Navigation and Timing (PNT) Subject Matter Expert (SME) Working Integrated Product Team (WIPT) Network Assisted (NA) Assured Positioning, Navigation and Timing (APNT)		

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army										Date: April 2022		
Appropriation/Budget Activity 2040 / 4					R-1 Program Element (Number/Name) PE 0603639A / Tank and Medium Caliber Ammunition				Project (Number/Name) FG1 / Cannon-Delivered Area Effects Munitions (C-DAEM)			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
FG1: Cannon-Delivered Area Effects Munitions (C-DAEM)	-	38.466	-	-	-	-	-	-	-	-	0.000	38.466
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cannon-Delivered Area Effects Munitions (C-DAEM) Project will provide United States (U.S). ground forces with the capability to engage area personnel through armored targets, while denying threat forces full operational freedom within the targeted area. An Analysis of Alternatives (AoA) was completed in January 2018 to inform Army acquisition and investment decisions regarding replacement of the current stockpile of 155 millimeter (mm) Dual Purpose Improved Conventional Munitions (DPICM) with Department of Defense (DoD) policy compliant munitions and address anti-armor and extended range capability requirements. The Army validated two materiel solutions for C-DAEM to be pursued in parallel. C-DAEM Armor (Increment 1) will destroy moved and moving infantry fighting vehicles, self-propelled howitzers, and tanks. C-DAEM DPICM Replacement (Increment 2) will destroy personnel to light-skinned vehicles. This Project does not have a Fiscal Year (FY) 2023 budget request.

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

	FY 2021	FY 2022	FY 2023
Title: C-DAEM Armor	38.466	-	-
Description: C-DAEM Armor will destroy infantry fighting vehicles, self-propelled howitzers, and tanks.			
Accomplishments/Planned Programs Subtotals	38.466	-	-

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
• FJ4: Cannon-Delivered Area Effects Munitions (C-DAEM)	20.079	85.997	92.402	-	92.402	86.869	70.359	55.644	56.185	0.000	467.535
• E68603: PROJ, ARTY, 155MM C-DAEM INCREMENT 1	-	-	-	-	-	-	-	-	-		

Remarks

In FY 2021, Project FG1 supports C-DAEM Armor efforts. C-DAEM Armor will transition to Budget Activity 05 PE 0604802A Weapons and Munitions - Eng Dev Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM), in FY 2022. In FY 2023, C-DAEM Armor will transition to production. A Procurement of Ammunition, Army (PAA) funding line, Standard Study Number (SSN) E68603, PROJ, ARTY, 155MM C-DAEM INCREMENT 1, is established for this effort.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FG1 / <i>Cannon-Delivered Area Effects Munitions (C-DAEM)</i>

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
<p>In FY 2021, the C-DAEM DPICM Replacement effort will transition to BA 05 PE 0604802A Weapons and Munitions - Eng Dev Project FJ4, Cannon-Delivered Area Effects Munitions (C-DAEM). A PAA funding line for C-DAEM DPICM Replacement, SSN E68604, PROJ, ARTY, 155MM C-DAEM INCREMENT 2, will be established in FY 2024 for this effort.</p>											

D. Acquisition Strategy

C-DAEM will employ an evolutionary acquisition approach to efficiently transition the unique ammunition products as they become available. The AoA completed on 31 January 2018 qualified a dramatic enhancement of operational Fires effectiveness, efficiency, and maneuver support when cannon artillery was equipped with a dedicated extended range, anti-armor projectile. The U.S. Government is currently reducing risk by executing prototype testing and evaluation efforts in parallel to decompose the AoA results into selection criteria. C-DAEM will use the selection criteria to sponsor a competitive demonstration for C-DAEM Armor to streamline the acquisition process by leveraging Section 815 of the FY 2016 National Defense Authorization Act (NDAA). C-DAEM will use the Defense Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) to further support the completion of the C-DAEM Armor competitive demonstration phase, in FY 2021, which will inform the Army's cluster munition replacement strategy. Upon completion of the competitive demonstration phase, C-DAEM will proceed to qualification testing of the most promising candidate(s) in accordance with the decisions granted at the Army Requirements Oversight Council (AROC), in April 2018.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603639A / Tank and Medium Caliber Ammunition				FG1 / Cannon-Delivered Area Effects Munitions (C-DAEM)							
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	3.090	0.360	Oct 2020	-		-		-		-	Continuing	Continuing	Continuing
Subtotal			3.090	0.360		-		-		-		-	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Armor TMRR Phase	MIPR	DoD Ordnance Technology Consortium (DOTC) : TBD	20.375	31.594	Nov 2020	-		-		-		-	Continuing	Continuing	Continuing
Subtotal			20.375	31.594		-		-		-		-	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Armor Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	2.722	5.229	Nov 2020	-		-		-		-	Continuing	Continuing	Continuing
Armor Engineering Support	MIPR	Combat Capabilities Development Command Data Analysis Center (CCDC DAC) : Aberdeen, MD	0.106	-		-		-		-		-	0.000	0.106	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 4				PE 0603639A / Tank and Medium Caliber Ammunition				FG1 / Cannon-Delivered Area Effects Munitions (C-DAEM)							
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Armor Fire Control Software Integration	MIPR	U.S. Army Communications-Electronics Command (CECOM) : Aberdeen, MD	-	0.683	Jan 2021	-		-		-		-	0.000	0.683	-
DPICM Replacement Engineering Support	MIPR	Combat Capabilities Development Command Armaments Center (CCDC AC) : Picatinny Arsenal, NJ	0.250	-		-		-		-		-	0.000	0.250	-
Subtotal			3.078	5.912		-		-		-		-	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
Armor Test Targets	MIPR	Army Test and Evaluation Command (ATEC) - Yuma Proving Grounds : Yuma, AZ	0.694	-		-		-		-		-	0.000	0.694	-
Armor Testing	MIPR	Army Test & Evaluation Command (ATEC) : Yuma, AZ	-	0.600	Apr 2021	-		-		-		-	Continuing	Continuing	Continuing
Subtotal			0.694	0.600		-		-		-		-	Continuing	Continuing	N/A
Project Cost Totals			27.237	38.466		-		-		-		-	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FG1 / <i>Cannon-Delivered Area Effects Munitions (C-DAEM)</i>

Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
BONUS Deliveries (Bridging Strategy)																												
	<i>Bridging Strategy</i>																											
Armor TMRR																												
	<i>TMRR</i>																											
Armor Preliminary Design Review (PDR)	▲ 1 PDR																											
Armor Competitive Demonstration		▲ 2 Demo																										
Armor Milestone B			▲ 3 MS-B																									
Armor Engineering Manufacturing & Development (EMD)																												
					<i>EMD</i>																							
Armor Critical Design Review (CDR)						▲ 4 CDR																						
Armor Milestone C												▲ 5 MS-C																
DPICM Replacement Qualification and Testing																												
	<i>DPICM Replacement Qual & Testing</i>																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / <i>Tank and Medium Caliber Ammunition</i>	Project (Number/Name) FG1 / <i>Cannon-Delivered Area Effects Munitions (C-DAEM)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
C-DAEM AoA, CDD, MS-A Efforts	1	2018	4	2019
Armor Milestone A	1	2019	1	2019
BONUS Deliveries (Bridging Strategy)	1	2020	4	2022
Armor TMRR	1	2019	4	2021
Armor Preliminary Design Review (PDR)	1	2021	1	2021
Armor Competitive Demonstration	3	2021	3	2021
Armor Milestone B	4	2021	4	2021
Armor Engineering Manufacturing & Development (EMD)	1	2022	4	2024
Armor Critical Design Review (CDR)	2	2022	2	2022
Armor Milestone C	4	2024	4	2024
DPICM Replacement Qualification and Testing	1	2021	4	2023

Note

Cannon-Delivered Area Effects Munitions (C-DAEM) Armor will destroy infantry fighting vehicles, self-propelled howitzers, and tanks. C-DAEM Dual Purposed Improved Conventional Munitions (DPICM) Replacement will destroy personnel to light-skinned vehicles. C-DAEM Armor and DPICM Replacement are being developed simultaneously.