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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army											Date: February 2016	
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)					PE 0604802A / Weapons and Munitions - Eng Dev							
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	17.312	21.379	80.365	-	80.365	130.596	131.880	109.712	80.952	Continuing	Continuing
613: MORTAR SYSTEMS	-	0.000	0.000	18.348	-	18.348	36.200	32.730	9.600	0.000	0.000	96.878
EC1: 40mm Hi Vel and Low Vel Thermal Training Cartridge	-	9.580	7.257	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.837
EC4: Non-Standard Simulator Munitions	-	0.851	0.993	1.092	-	1.092	2.676	3.035	2.529	1.993	0.000	13.169
ED7: 120mm Advanced Multipurpose (AMP) Cartridge	-	0.000	0.000	31.215	-	31.215	31.655	28.018	0.000	0.000	0.000	90.888
EL9: Ammunitions Logistics Prototyping	-	0.000	2.599	0.106	-	0.106	0.459	0.645	0.754	0.550	0.000	5.113
EP2: Individual Assault Munition (IAM)	-	0.000	0.000	0.000	-	0.000	0.000	0.000	4.140	10.430	0.000	14.570
EP3: Reduced Range Small Caliber Training Ammunition	-	0.000	0.000	0.000	-	0.000	6.000	5.000	20.900	10.500	0.000	42.400
EP4: One-Way Lumiscence (OWL) for Small Caliber Ammo	-	0.000	0.000	0.000	-	0.000	3.200	2.900	8.600	11.500	0.000	26.200
EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo	-	0.000	0.000	10.270	-	10.270	11.309	7.820	8.428	5.826	Continuing	Continuing
EP6: Lightweight Cartridge Case for Small Caliber Ammo	-	0.000	0.000	1.290	-	1.290	3.808	3.820	7.829	4.826	Continuing	Continuing
EP7: Tunable Pyrotechnic Aircraft Countermeasure Flares	-	0.000	1.000	1.431	-	1.431	4.400	2.500	0.000	0.000	0.000	9.331
EU4: 40mm High Velocity High Explosive Airburst (HEDP)	-	0.000	0.000	0.303	-	0.303	2.809	6.820	6.828	6.825	0.000	23.585
EU5: .50 Caliber All-Purpose Tactical cartridge (APTC)	-	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	2.000	0.000	2.000
EU6: 155mm High Explosive Extended Range Artillery	-	0.000	0.000	0.000	-	0.000	0.000	7.000	5.000	3.000	0.000	15.000

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<i>EU7: Enhanced Lethality Cannon Munitions</i>	-	0.000	0.000	0.000	-	0.000	0.000	8.000	8.000	8.000	0.000	24.000
<i>EU8: Improved Multi-Option Fuze</i>	-	0.000	0.000	0.000	-	0.000	8.000	8.000	10.000	0.000	0.000	26.000
<i>EW1: 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203</i>	-	0.000	0.000	0.353	-	0.353	5.308	9.732	9.023	7.205	0.000	31.621
<i>S36: Precision Guidance Kit</i>	-	6.881	9.530	15.957	-	15.957	14.772	5.860	8.081	8.297	0.000	69.378

Note

In FY 2017, PE 0604802A Projects 613, EP5, EP6, EU4 and EW1 are new start programs.

A. Mission Description and Budget Item Justification

This program element funds multiple efforts for engineering development of weapons and munitions systems.

Project 613: The High Explosive Guided Mortar (HEGM) program funds engineering development of precision guidance systems applicable to Indirect Fire mortar weapon systems. HEGM provides a precision capability to support the close fight in urban and complex terrain, while at the same time, reducing collateral damage. HEGM provides precision accuracy and effectiveness for 120mm mortar systems using precision guidance systems that will effectively reduce target delivery error and reducing the number of rounds required to conduct a fire mission. The HEGM capability will be developed through the use of improved guidance and control components and advanced airframe design that allow sufficient maneuver of the cartridge in flight to correct for induced error providing the ability to engage targets without the need to adjust fire. The Weaponized Universal Lightweight Fire-control (WULF) program funds engineering development of fire-control systems applicable to Indirect Fire mortar weapon systems. WULF is a digital sight integrated with digital fire-control that is designed for aiming of the M252 81mm mortar system and other man portable mortar systems (60mm and 120mm). The digital sight unit and Fire Control will allow the Soldier to emplace the mortar systems faster and fire more accurately. WULF will replace the current M67 optical sight unit that currently cannot meet the threshold accuracy requirement in the M252 mortar Capability Production Document.

Project EC1: The Target Practice Day Night Thermal (TP-DNT) cartridges are 40mm grenade training cartridges. The Low Velocity (LV) variant is for training with the M203/M320 grenade launchers; the High Velocity (HV) variant is for training with the Mk19 grenade machine gun. Both cartridges will provide the Warfighter with a non-dud producing, environmentally friendly training cartridge that provides a visual impact signature seen day or night, by the naked eye, through night vision devices, and thermal weapon sights. These cartridges will replace the 40mm LV Target Practice, M781 cartridges and the 40mm HV Target Practice, M918/M385A1 (Mixed Belt) cartridges. It is expected that the unit price for high velocity cartridges will be lower than the Mixed Belt cartridges.

Project EC4: This project will standardize various pyrotechnic that simulate battlefield effects. The Army's Combat Training Centers (CTCs) are currently using non-standard munitions to replicate both conventional and asymmetric warfare battlefield effects. These modified commercial-off-the-shelf products have not been type classified, material released, and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/simulators to replicate both conventional and asymmetric warfare battlefield affects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Macro pyrotechnics to simulate hostile fire and small Improvised Explosive Devices (IEDs) during mounted operations in urban

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<p>terrain; Micro pyrotechnics to simulate indoor hostile fire and IED effects that are capable of being integrated into existing facilities; Rocket Propelled Grenade (RPG) on a wire to replicate the flight of a Rocket Propelled Grenade; High Order Blast Effect (HOBE) used to replicate a Vehicle Borne Improvised Explosive Device (VBIED), building explosions, and other significant explosive events; Artillery airburst (LA45) simulator to replicate indirect fire; simulator to replicate a STINGER (LA47) firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems, and mitigate safety risks associated with realistic scenario based training.</p> <p>Project ED7: The Advanced Multi Purpose (AMP) program is a direct fire line of sight 120mm large caliber munition under development for the Abrams Main Battle Tank. It has three modes of operation including point detonate, point detonate delay and airburst. AMP is the material solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50m to 2000m (T) and 50m to 4500m (O), a validated gap that cannot currently be met with existing stockpiled ammunition. In addition to added capability, AMP will also consolidate the capabilities of four existing stockpiled 120mm munitions, thereby addressing the users' battlecarry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including ATGM teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breech modification, the same required by the 120mm M829E4 cartridge that achieved Milestone C in FY 2014. FY 2016 supports multiple contracts with competing prototypes in Phase 1 of 2 for Engineering and Manufacturing Development (EMD). FY 2017 supports completion of Engineering and Manufacturing Development (EMD) Phase 1 and Engineering and Manufacturing Development (EMD) Phase 2 commences.</p> <p>Project EL9: The Ammunitions Logistics Prototyping 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.</p> <p>Project EP5: The Advanced Armor-Piercing (ADVAP) program is a critical technology development in response to the 7.62mm and 5.56mm Family of Ammunition Capabilities Development Documents (CDD). The nomenclature for the 7.62mm ADVAP is now XM1158 and the companion trace is XM1159. The overall objective of the ADVAP program is to develop and Full Materiel Release (FMR) a 7.62mm XM1158 cartridge linked 4:1 with a trace cartridge (XM1159) followed by a 5.56mm cartridge variant that will provide overmatch capability to defeat advanced light armored threats within typical machine gun ranges. The 7.62mm XM1158 and XM1159 cartridges will be optimized for use in the M240 Machine Gun. FY 2017 funding will support EMD efforts to include maturing manufacturing as well as optimization of the XM1158 and XM1159 cartridge designs.</p> <p>Project EP6: The Lightweight Small Caliber Ammunition (LSCA) program is a critical technology development in response to the 7.62mm and .50 Caliber Family of Ammunition Capabilities Development Documents (CDD). The goal of the LSCA Program is to reduce the Soldier load through reduction in ammunition weight. The LSCA Program will develop and field 7.62mm LSCA cartridges that will provide the same capabilities as the M80A1 and M62A1 cartridges. The LSCA cartridge will be designed to be compatible with all Army 7.62mm weapon systems, but specifically optimized to work in the M240 Machine Gun. After the 7.62mm cartridge is matured</p>		

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<p>a .50 Caliber variant will be developed. FY 2017 funding will support the source selection evaluation process and the development of entrance and exit criteria for the Engineering and Manufacturing Development (EMD) Phase I efforts.</p> <p>Project EP7: This project will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on current pyrotechnic munitions and tunable pyrotechnic aircraft counter measures and decoys. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, engineering to reduce size and weight, environmental considerations, safety enhancements, manufacturing enhancements, qualification of other service and foreign munitions that could meet current requirements, product improvements, insertion of new technologies to increase performance, and enhancement of current flare solutions for new and existing aircraft. Systems include impulse cartridges, pen flares, hand held signals, trip flares, simulators, marine markers, smoke pots, smoke grenades, rail road flares and other type of emergency/distress devices, aircraft expendables (to include Radio Frequency (RF) expendables), and primers used in munitions systems.</p> <p>Project EU4: The Army has identified a capability gap to defeat enemy personnel in defilade using the MK19 weapons system. The draft Capability Development Document (CDD) has been prepared and is expected to be approved in FY 2017. The improved 40mm High Velocity HEAB cartridge, with airburst fuze, allows the warfighter to effectively engage multiple targets and provide the grenadier with a higher probability of defeating personnel targets in defilade positions, increasing Soldier Survivability. FY 2017 dollars support the development of the Acquisition Strategy, Milestone B, and procurement support documents.</p> <p>Project EW1: The 40mm Low Velocity (LV) Increased Range Anti-Personnel (IRAP) tactical cartridge allows the warfighter to effectively engage multiple targets, at increased ranges using the 40mm M203 and M320 Grenade Launchers. The IRAP cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions at increased ranges with greater accuracy and lethality. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel or achieve a mobility kill against unarmored vehicles at increased ranges beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. IRAP is a new capability identified as a Warfighter requirement in the Capability Development Document, 40mm, Low Velocity Family of Ammunition Annex A1, Increased Range Anti-Personnel Cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges increasing Soldier Survivability. FY 2017 supports Milestone B approval, Request for Proposal (RFP) preparation, Source Selection Planning, Government Technical Development and Cooperative Research and Development Agreement (CRADA) Testing. Engineering, Manufacturing Development will commence in FY 2017.</p> <p>Project S36: This program funds engineering development of precision guidance systems applicable to Indirect Fire artillery weapon systems. The Precision Guidance Kit (PGK) is a Global Positioning System guidance kit with fuzing functions. PGK provides near precision accuracy and effectiveness for 155mm High Explosive artillery projectiles. PGK improves the accuracy of existing artillery ammunition by correcting the trajectory of projectiles to their designated target location. Precision guidance systems effectively reduce target delivery error reducing the number of rounds required to conduct a fire mission. On-going development addresses performance in jammed environments as well as the implementation of an M-Code capable GPS receiver.</p>		

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B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	14.998	21.379	27.816	-	27.816
Current President's Budget	17.312	21.379	80.365	-	80.365
Total Adjustments	2.314	0.000	52.549	-	52.549
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	2.314	-	52.549	-	52.549

Change Summary Explanation

In FY 2017, PE 0604802A Projects 613, ED7, EP5, EP6, EU4, and EW1 are new start programs.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) 613 / MORTAR SYSTEMS
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
613: MORTAR SYSTEMS	-	0.000	0.000	18.348	-	18.348	36.200	32.730	9.600	0.000	0.000	96.878
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
High Explosive Guided Mortar (HEGM) and Weaponized Universal Lightweight Fire-Control (WULF) are new start programs in FY 2017.

A. Mission Description and Budget Item Justification

The High Explosive Guided Mortar (HEGM) program funds engineering development of precision guidance systems applicable to Indirect Fire mortar weapon systems. HEGM provides a precision capability to support the close fight in urban and complex terrain, while at the same time, reducing collateral damage. HEGM provides precision accuracy and effectiveness for 120mm mortar systems using precision guidance systems that will effectively reduce target delivery error and reducing the number of rounds required to conduct a fire mission. The HEGM capability will be developed through the use of improved guidance and control components and advanced airframe design that allow sufficient maneuver of the cartridge in flight to correct for induced error providing the ability to engage targets without the need to adjust fire.

The Weaponized Universal Lightweight Fire-control (WULF) program funds engineering development of fire-control systems applicable to Indirect Fire mortar weapon systems. WULF is a digital sight integrated with digital fire-control that is designed for aiming of the M252 81mm mortar system and other man portable mortar systems (60mm and 120mm). The digital sight unit and Fire Control will allow the Soldier to emplace the mortar systems faster and fire more accurately. WULF will replace the current M67 optical sight unit that currently cannot meet the threshold accuracy requirement in the M252 mortar Capability Production Document.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>Title: HEGM</p> <p>Description: Engineering and Manufacturing Development Phase</p> <p>FY 2017 Base Plans: Program initiation to enter into the Engineering and Manufacturing Development phase. Activities include Materiel Development Decision approval, milestone B Approval, award of development efforts, and initiation of preliminary design.</p>	-	-	16.348	-	16.348
<p>Title: WULF</p> <p>Description: Engineering development and software integration.</p> <p>FY 2017 Base Plans:</p>	-	-	2.000	-	2.000

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Engineering development and software refinement of matured prototype to support the of Line-Replaceable-Unit Environmental test.					
Accomplishments/Planned Programs Subtotals	-	-	18.348	-	18.348

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• E25511: HEGM	-	-	-	-	-	-	-	8.500	41.800	461.200	511.500
• K99200: WULF	-	-	-	-	-	-	-	5.600	7.500	20.662	33.762

Remarks
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D. Acquisition Strategy
HEGM - The Acquisition strategy is under development and will be approved by the Milestone Decision Authority (MDA) once complete. It is anticipated that it will be full and open competition. The program will be at TRL 6 (prototype demonstrated in a relevant environment) in FY 2017. The Acquisition Strategy is expected to be approved by the Milestone Decision Authority (MDA) in FY 2017. Milestone C approval in FY 2021 and First Unit Equipped in FY 2022.

WULF is being developed under The U.S. Army Armament Research, Development and Engineering Center (ARDEC) Science & Technology initiative and currently assessed at Technology Readiness Level (TRL) 4 maturity. The program will be at TRL 6 (prototype demonstrated in a relevant environment) in FY 2017. The Acquisition Strategy is expected to be approved by the Milestone Decision Authority (MDA) in FY 2017. This program will be developed in-house by ARDEC during the Engineering and Manufacturing Development (EMD) phase. Type Classification and Milestone C approval is anticipated in FY 2021. Full rate production and First Unit Equipped is expected by the end of FY 2022.

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				613 / MORTAR SYSTEMS								
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
HEGM System Development	TBD	TBD : TBD	0.000	-		-		10.468	Apr 2017	-		10.468	49.384	59.852	59.852	
HEGM - Fire Control	MIPR	ARDEC : Picatinny, NJ	0.000	-		-		0.880	Apr 2017	-		0.880	2.806	3.686	3.686	
WULF System Development	MIPR	ARDEC : Picatinny, NJ	0.000	-		-		0.588	Mar 2017	-		0.588	3.832	4.420	4.420	
Subtotal			0.000	-		-		11.936		-		11.936	56.022	67.958	67.958	
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
HEGM - PM Office	PO	PM CAS : Picatinny, NJ	0.000	-		-		1.300	Dec 2016	-		1.300	5.002	6.302	6.302	
HEGM - ARDEC Engineering Support	MIPR	ARDEC : Picatinny, NJ	0.000	-		-		2.200	Dec 2016	-		2.200	6.160	8.360	8.360	
WULF - PM Office	PO	PM CAS : Picatinny, NJ	0.000	-		-		0.180	Dec 2016	-		0.180	0.913	1.093	1.093	
WULF - ARDEC Engineering Support	MIPR	ARDEC : Picatinny, NJ	0.000	-		-		0.902	Dec 2016	-		0.902	1.844	2.746	2.746	
Subtotal			0.000	-		-		4.582		-		4.582	13.919	18.501	18.501	
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
HEGM - Developmental Testing	MIPR	Yuma Proving Ground : Yuma, AZ	0.000	-		-		1.500	Jul 2017	-		1.500	7.800	9.300	9.300	
WULF - Environmental Testing	MIPR	TBD : TBD	0.000	-		-		0.330	Mar 2017	-		0.330	0	0.330	0.330	

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
(1) HEGM - MDD					▲ 1 MDD																							
(2) HEGM - Milestone B					▲ 2 MS B																							
HEGM - Engineering & Manufacturing Development													EMD															
(3) HEGM - Milestone C																					▲ 3 MS C							
(4) WULF - Milestone B					▲ 4 MS B									EMD														
WULF - Engineering & Manufacturing Development													EMD															
WULF - Limited User Test																					LUT							
(5) WULF - Milestone C																									▲ 5 MS C			
WULF - First Article Acceptance Test																					FAAT							

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
HEGM - MDD	3	2016	3	2016
HEGM - Milestone B	3	2017	3	2017
HEGM - Engineering & Manufacturing Development	3	2017	3	2021
HEGM - Milestone C	3	2021	3	2021
WULF - Milestone B	2	2017	2	2017
WULF - Engineering & Manufacturing Development	3	2017	2	2021
WULF - Limited User Test	3	2020	1	2021
WULF - Milestone C	2	2021	2	2021
WULF - First Article Acceptance Test	4	2021	2	2022

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Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EC1 / 40mm Hi Vel and Low Vel Thermal Training Cartridge			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EC1: 40mm Hi Vel and Low Vel Thermal Training Cartridge	-	9.580	7.257	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.837
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2015 program activities transitioned from PE 643639 Project 694.

A. Mission Description and Budget Item Justification

The Target Practice Day Night Thermal (TP-DNT) cartridges are 40mm grenade training cartridges. The Low Velocity (LV) variant is for training with the M203/M320 grenade launchers; the High Velocity (HV) variant is for training with the Mk19 grenade machine gun. Both cartridges will provide the Warfighter with a non-dud producing, environmentally friendly training cartridge that provides a visual impact signature seen day or night, by the naked eye, through night vision devices, and thermal weapon sights. These cartridges will replace the 40mm LV Target Practice, M781 cartridges and the 40mm HV Target Practice, M918/M385A1 (Mixed Belt) cartridges. It is expected that the unit price for high velocity cartridges will be lower than the Mixed Belt cartridges.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Target Practice Day Night Thermal Cartridges	9.580	7.257	-	-	-
Description: The Target Practice Day Night Thermal (TP-DNT) Cartridges are 40mm grenade training cartridges					
FY 2015 Accomplishments: FY 2015 activities included EMD contract awards for both the HV and LV variants.					
FY 2016 Plans: FY 2016 developmental engineering test activities for both HV and LV variants..					
Accomplishments/Planned Programs Subtotals	9.580	7.257	-	-	-

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

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 40mm Hi Vel and Low Vel Thermal Trg: 40mm Hi Vel and Low Vel Thermal Trg PE 603639 Project 694	-	-	-	-	-	-	-	-	-	0	0.000

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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC1 / 40mm Hi Vel and Low Vel Thermal Training Cartridge
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u> <u>Base</u>	<u>FY 2017</u> <u>OCO</u>	<u>FY 2017</u> <u>Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• Target Practice Day Night Thermal: <i>Target Practice Day Night</i> <i>Thermal Cartridges Procurement</i> <i>(SSNs: E05610, E05611)</i>	-	-	118.178	-	118.178	111.276	89.530	100.200	100.860	0	520.044

Remarks

Production dollars will be used to procure 40mm training cartridges. If the TP-DNT production contract is delayed, it will be necessary to exercise an option on the existing 40mm Systems Contract and procure 40mm Mixed Belt Cartridges.

D. Acquisition Strategy

The TP-DNT cartridges are being developed through a competitive Engineering and Manufacturing Development (EMD) program. The EMD phase is developing both Low Velocity (LV) and High Velocity (HV) variants that will utilize the same critical technologies, making concurrent acquisitions a logical approach to reduce overall acquisition costs. As part of the EMD source selection, a Bid Sample shoot-off competition was conducted to evaluate potential designs. Within funding constraints, multiple contractor designs were awarded EMD contracts with intent to down select to one contractor for the HV variant and one contractor for the LV variant. Following the down select, Low Rate Initial Production (LRIP) and two production year options will be considered. Milestone C is scheduled for 3Q FY 2017.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC1 / 40mm Hi Vel and Low Vel Thermal Training Cartridge
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
AMTEC - 40mm LV TP-NDT	C/FFP	Janesville : WI	0.000	2.075		-		-		-		-	0	2.075	0
AMTEC - 40mm HV TP-DNT	C/FFP	Janesville : WI	0.000	0.658		-		-		-		-	0	0.658	0
American Ordnance LLC - 40mm HV TP-DNT	C/FFP	Middletown : IA	0.000	3.000		-		-		-		-	0	3.000	0
Program Manager Maneuver Ammunition Systems (PM MAS) labor and travel	MIPR	Picatinny Arsenal : NJ	0.000	-		0.387		-		-		-	0	0.387	0
GD-OTS - 40mm LV TP-DNT	C/FFP	Marion : IL	0.000	2.854		-		-		-		-	0	2.854	0
Subtotal			0.000	8.587		0.387		-		-		-	0.000	8.974	0.000

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Armament Research, Development, and Engineering Center (ARDEC)	MIPR	PICATINNY ARSENAL : NJ	0.000	0.987		1.789		-		-		-	0	2.776	0
Subtotal			0.000	0.987		1.789		-		-		-	0.000	2.776	0.000

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Aberdeen Test and Evaluation Center (ATEC)	MIPR	Aberdeen : MD	0.000	-		4.300		-		-		-	0	4.300	0
Dahlgren NSWC	MIPR	Dahlgren : VA	0.000	0.006		0.065		-		-		-	0	0.071	0

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC1 / 40mm Hi Vel and Low Vel Thermal Training Cartridge
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
(1) Engineering Manufacturing Development Contract Award	EMD Contract ▲1																											
Engineering Manufacturing Development	EMD ■																											
Bid Sample Testing	■																											
(2) Test Readiness Review DET I	TRR DET 1 ▲2																											
Development Engineering Test Phase I	DET 1 ■																											
(3) Test Readiness Review DET II	TRR DET 2 ▲3																											
Development Engineering Test Phase II	DET 2 ■																											
(4) Test Readiness Review DT&E	TRR DT&E ▲4																											
Development Test & Evaluation	DT&E ■																											
(5) MS-C	MS-C ▲5																											
(6) Production Contract Award	Production Contract Award ▲6																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC1 / 40mm Hi Vel and Low Vel Thermal Training Cartridge

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Engineering Manufacturing Development Contract Award	4	2015	4	2015
Engineering Manufacturing Development	4	2015	3	2017
Bid Sample Testing	4	2014	1	2015
Test Readiness Review DET I	1	2016	1	2016
Development Engineering Test Phase I	2	2016	2	2016
Test Readiness Review DET II	3	2016	3	2016
Development Engineering Test Phase II	4	2016	4	2016
Test Readiness Review DT&E	1	2017	1	2017
Development Test & Evaluation	2	2017	2	2017
MS-C	3	2017	3	2017
Production Contract Award	3	2017	3	2017

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev			Project (Number/Name) EC4 / Non-Standard Simulator Munitions				
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EC4: Non-Standard Simulator Munitions	-	0.851	0.993	1.092	-	1.092	2.676	3.035	2.529	1.993	0.000	13.169
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project will standardize various pyrotechnic that simulate battlefield effects. The Army's Combat Training Centers (CTCs) are currently using non-standard munitions to replicate both conventional and asymmetric warfare battlefield effects. These modified commercial-off-the-shelf products have not been type classified, material released, and are not safe or sustainable for use by Soldiers. This effort will develop and demonstrate various pyrotechnics/simulators to replicate both conventional and asymmetric warfare battlefield effects such as: Black smoke signature (burning vehicles, buildings, and equipment); Yellow smoke signature (chemical, biological or nuclear effects); Macro pyrotechnics to simulate hostile fire and small Improvised Explosive Devices (IEDs) during mounted operations in urban terrain; Micro pyrotechnics to simulate indoor hostile fire and IED effects that are capable of being integrated into existing facilities; Rocket Propelled Grenade (RPG) on a wire to replicate the flight of a Rocket Propelled Grenade; High Order Blast Effect (HOBE) used to replicate a Vehicle Borne Improvised Explosive Device (VBIED), building explosions, and other significant explosive events; Artillery airburst (LA45) simulator to replicate indirect fire; simulator to replicate a STINGER (LA47) firing; Tracer Fire-back simulator to replicate enemy small arms fire and anti-aircraft fire. Standardization will reduce training costs, eliminate redundancies between systems, and mitigate safety risks associated with realistic scenario based training.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Standardize Special Use Ammunition	0.851	0.993	1.092	-	1.092
Description: Standardize non-standard pyrotechnic battlefield effects currently used by CTCs .					
FY 2015 Accomplishments: This project supported development and preparation of documentation for Materiel Development Decision (MDD) approval briefing to PEO and ASAALT approval for capabilities required to simulate battlefield effects. Researched and reevaluated prior smoke efforts.					
FY 2016 Plans: This project will support the Engineering Manufacturing and Development (EMD) phase for Force on Target Black Smoke signature (burning vehicles, buildings, and equipment), Artillery airburst simulator and Tracer/ STINGER simulators. Review and qualify test data for LA45 and LA47; evaluate Marine Type Classification (TC) and Material Release (MR) data; Conduct test and evaluation; TC and Full Material Release (FMR) for Final Operational Test (FOT) cartridge.					
FY 2017 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC4 / Non-Standard Simulator Munitions

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
This project will support the Engineering Manufacturing and Development (EMD) phase for Force on Force Black Smoke signature (burning vehicles, buildings, and equipment), Artillery airburst simulator and Tracer/STINGER simulators. Material Release (MR) the LA45 and LA47; TC and Full Material Release (FMR) for Black Smoke Force on Target (FOT) cartridge. T&E and commence TC activities for FOT yellow smoke and Force on Force (FOF) black smoke, T&E RPG on a wire and VBIED.					
Accomplishments/Planned Programs Subtotals	0.851	0.993	1.092	-	1.092

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

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• Procurement Ammunition, Army: <i>Simulators, Non-Standard, Special Effects for CTCs; SSN E88404</i>	-	-	0.979	-	0.979	1.632	1.663	1.699	1.750	0.000	7.723

Remarks

D. Acquisition Strategy

The Acquisition strategy is for a family of special use ammunition that will be developed in incremental phases as funding and requirements are approved. MDD Approval 3rdQ FY2016. Initial special use ammunition will be black and yellow smoke munitions followed by new increments that will defeat threats outlined in the requirements documents developed by TRADOC.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC4 / Non-Standard Simulator Munitions
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Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	MIPR	PM Close Combat Systems : PICATINNY ARSENAL	0.000	0.244		0.100		0.096	Jan 2017	-		0.096	0	0.440	0
Subtotal			0.000	0.244		0.100		0.096		-		0.096	0.000	0.440	0.000

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	MIPR	ARDEC : PICATINNY ARSENAL	0.000	0.607		0.790		0.696	Jan 2017	-		0.696	0	2.093	0
Subtotal			0.000	0.607		0.790		0.696		-		0.696	0.000	2.093	0.000

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	MIPR	ARDEC : Picatinny	0.000	-		0.103		0.300	Jan 2017	-		0.300	0	0.403	0
Subtotal			0.000	-		0.103		0.300		-		0.300	0.000	0.403	0.000

			Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.851	0.993	1.092	-	1.092	0.000	2.936	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EC4 / Non-Standard Simulator Munitions
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021											
	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								
Material Development Decision Special Use Ammunition Pyrotechnics					MDD																															
Review/qualify Marine Corps test data for LA45/LA47																																				
Evaluate Marine Corps TC/MR																																				
Conduct T&E, TC/MR black smoke cartridge																																				
(1) MS C Black Smoke Simulator																																				
Conduct T&E, TC/MR Force on Force Yellow Smoke																																				
(2) MS C Yellow Smoke Simulator																																				
(3) MS C Force on Force Simulator																																				
(4) MS C RPG																																				
(5) MS C Micro-Macro																																				

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EC4 / <i>Non-Standard Simulator Munitions</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Materiel Development Decision Special Use Ammunition Pyrotechnics	2	2016	3	2016
Review/qualify Marine Corps test data for LA45/LA47	1	2017	1	2017
Evaluate Marine Corps TC/MR	2	2017	3	2017
Conduct T&E, TC/MR black smoke cartridge	2	2017	3	2017
MS C Black Smoke Simulator	4	2017	4	2017
Conduct T&E, TC/MR Force on Force Yellow Smoke	4	2017	4	2017
MS C Yellow Smoke Simulator	2	2018	2	2018
MS C Force on Force Simulator	3	2019	3	2019
MS C RPG	3	2020	3	2020
MS C Micro-Macro	4	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) ED7 / 120mm Advanced Multipurpose (AMP) Cartridge			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
ED7: 120mm Advanced Multipurpose (AMP) Cartridge	-	0.000	0.000	31.215	-	31.215	31.655	28.018	0.000	0.000	0.000	90.888
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The 0604802A ED7, 120mm Advanced Multipurpose (AMP) Cartridge, program is not a new start. Funds in this program in FY 2017 are a realignment of funds from program 0603639A 656, 120mm Cartridge (Advanced Multipurpose-AMP), for more efficient, effective program management.

A. Mission Description and Budget Item Justification

The Advanced Multi Purpose (AMP) program is a direct fire line of sight 120mm large caliber munition under development for the Abrams Main Battle Tank. It has three modes of operation including point detonate, point detonate delay and airburst. AMP is the material solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50m to 2000m (T) and 50m to 4500m (O), a validated gap that cannot currently be met with existing stockpiled ammunition. In addition to added capability, AMP will also consolidate the capabilities of four existing stockpiled 120mm munitions, thereby addressing the users' battlecarry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including ATGM teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breach modification, the same required by the 120mm M829E4 cartridge that achieved Milestone C in FY 2014. FY 2016 supports multiple contracts with competing prototypes in Phase 1 of 2 for Engineering and Manufacturing Development (EMD). FY 2017 supports completion of Engineering and Manufacturing Development (EMD) Phase 1 and initiation of Engineering and Manufacturing Development (EMD) Phase 2.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Engineering and Manufacturing Development (EMD) Phase 1	-	-	2.039	-	2.039
Description: Funding is provided for the following effort.					
FY 2017 Base Plans: Complete Engineering and Manufacturing Development (EMD) Phase 1 including competitive shoot off, data collection/evaluation and downselect to one prime contractor in 2Q FY 2017.					
Title: Engineering and Manufacturing Development (EMD) Phase 2	-	-	29.176	-	29.176
Description: Funding is provided for the following effort:					
FY 2017 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army	Date: February 2016
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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) ED7 I 120mm Advanced Multipurpose (AMP) Cartridge
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
During Phase 2 of EMD, which begins after down select to a single contractor, a single design will be matured, analyzed, tested, and evaluated to ensure all requirements will be met/exceeded. Detailed safety and performance tests will be conducted and the subsystem designs will be optimized for performance. Manufacture and procurement of cartridges for the second Cartridge Integration Test will take place during FY 2017.					
Accomplishments/Planned Programs Subtotals	-	-	31.215	-	31.215

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• AMP (PE / Project: 0603639A / 656): 120mm Cartridge (Advanced Multipurpose-AMP)	14.179	27.578	-	-	-	-	-	-	-	0	41.757
• AMP (SSN: E88105): 120mm Advanced Multipurpose (AMP) Cartridge	-	-	-	-	-	-	25.000	36.000	41.950	0.000	102.950

Remarks

D. Acquisition Strategy
The Advanced Multi Purpose Program (AMP) achieved Milestone B and entered Engineering and Manufacturing Development (EMD) in FY 2015. EMD consists of two phases; Phase 1 awarded two contracts to competitively prototype in FY 2015. A cartridge demonstration test will be conducted and used to support downselect to a single contractor for EMD Phase 2, followed by two Low Rate Initial Productions in FY 2019 and FY 2020 and one optional year of procurement in FY 2021.

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				ED7 I 120mm Advanced Multipurpose (AMP) Cartridge								
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Program Manager Maneuver Ammunition Systems (PM-MAS) Labor and travel	MIPR	Picatinny : NJ	1.747	-		-		1.148		-		1.148	Continuing	Continuing	Continuing	
Contractor 1	C/CPIF	TBD : TBD	32.450	-		-		23.728		-		23.728	Continuing	Continuing	Continuing	
Subtotal			34.197	-		-		24.876		-		24.876	-	-	-	
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Army Research, Development and Engineering Center (ARDEC)	MIPR	Picatinny : NJ	4.411	-		-		2.079		-		2.079	Continuing	Continuing	Continuing	
Subtotal			4.411	-		-		2.079		-		2.079	-	-	-	
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Yuma Test Center	MIPR	Yuma Proving Ground : AZ	1.500	-		-		2.123		-		2.123	Continuing	Continuing	Continuing	
Aberdeen Test Center	MIPR	Aberdeen Proving Ground : MD	2.219	-		-		2.137		-		2.137	Continuing	Continuing	Continuing	
Subtotal			3.719	-		-		4.260		-		4.260	-	-	-	
Project Cost Totals			42.327	-		0.000		31.215		-		31.215	-	-	-	

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) ED7 I 120mm Advanced Multipurpose (AMP) Cartridge
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021															
	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												
(1) Milestone B	I																																							
(2) EMD Contract Phase I Awards																																								
Engineering and Manufacturing Development (EMD) Phase I																																								
(3) Preliminary Design Review (PDR)	EMD Contract I																																							
(4) EMD Contract Phase II Award / Down-Select																																								
Engineering and Manufacturing Development (EMD) Phase II																																								
(5) Critical Design Review	EMD Contract Phase II Award / Down-Select																																							
Developmental Test and Evaluation (DT&E)																																								
(6) Milestone C	EMD Phase I																																							
Low Rate Initial Production 1																																								
Live Fire Test and Evaluation	EMD Phase II																																							
Initial Operational Test and Evaluation																																								
Low Rate Initial Production 2	EMD Phase II																																							

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) ED7 I <i>120mm Advanced Multipurpose (AMP) Cartridge</i>

Schedule Details

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

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EL9 / Ammunitions Logistics Prototyping			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EL9: Ammunitions Logistics Prototyping	-	0.000	2.599	0.106	-	0.106	0.459	0.645	0.754	0.550	0.000	5.113
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.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Munitions Survivability and Logistics Enablers	-	2.599	0.106	-	0.106
Description: This program will develop ammunition logistics systems that improve munitions survivability and logistics					
FY 2016 Plans: Develop ammunition logistics systems that improve munitions survivability and logistics.					
FY 2017 Base Plans: Integrate low cost thermal indicator with developmental ammunition items and conduct qualification testing.					
Accomplishments/Planned Programs Subtotals	-	2.599	0.106	-	0.106

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

N/A

Remarks

D. Acquisition Strategy

Not applicable

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EL9 / <i>Ammunitions Logistics Prototyping</i>

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EL9 / Ammunitions Logistics Prototyping
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021															
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4												
System Development - Munitions Health Monitoring System																																								
System Development - Low Cost Thermal Indicator																																								
System Development - Plastic Cylindrical Container																																								
System Development - Plastic Rectangular Container																																								

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EL9 / Ammunitions Logistics Prototyping

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Development - Munitions Health Monitoring System	1	2018	4	2021
System Development - Low Cost Thermal Indicator	1	2017	4	2021
System Development - Plastic Cylindrical Container	1	2018	4	2021
System Development - Plastic Rectangular Container	1	2020	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP2 / Individual Assault Munition (IAM)			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EP2: Individual Assault Munition (IAM)	-	0.000	0.000	0.000	-	0.000	0.000	0.000	4.140	10.430	0.000	14.570
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

no funding until FY20

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP3 / Reduced Range Small Caliber Training Ammunition			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EP3: <i>Reduced Range Small Caliber Training Ammunition</i>	-	0.000	0.000	0.000	-	0.000	6.000	5.000	20.900	10.500	0.000	42.400
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

no funding until FY18

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP4 / One-Way Lumiscence (OWL) for Small Caliber Ammo
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EP4: <i>One-Way Lumiscence (OWL) for Small Caliber Ammo</i>	-	0.000	0.000	0.000	-	0.000	3.200	2.900	8.600	11.500	0.000	26.200
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

no funding until FY18

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo	-	0.000	0.000	10.270	-	10.270	11.309	7.820	8.428	5.826	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The 0604802A EP5, Advanced Armor-Piercing (ADVAP) for Small Caliber Ammunition, program is not a new start. Funds in this program in FY 2017 are a realignment of funds from program 0603639A EC2, Advanced Armor-Piercing (ADVAP) for Small Cal Ammunition, for more efficient and effective program management. The 0604802A EP5 ADVAP funding line continues the development work of both 7.62mm and 5.56mm ADVAP cartridges into Engineering and Manufacturing Development (EMD).

A. Mission Description and Budget Item Justification

The Advanced Armor-Piercing (ADVAP) program is a critical technology development in response to the 7.62mm and 5.56mm Family of Ammunition Capabilities Development Documents (CDD). The nomenclature for the 7.62mm ADVAP is now XM1158 and the companion trace is XM1159. The overall objective of the ADVAP program is to develop and Full Materiel Release (FMR) a 7.62mm XM1158 cartridge linked 4:1 with a trace cartridge (XM1159) followed by a 5.56mm cartridge variant that will provide overmatch capability to defeat advanced light armored threats within typical machine gun ranges. The 7.62mm XM1158 and XM1159 cartridges will be optimized for use in the M240 Machine Gun. FY 2017 funding will support EMD efforts to include maturing manufacturing as well as optimization of the XM1158 and XM1159 cartridge designs.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: 7.62mm Engineering & Manufacturing Development (EMD)	-	-	10.270	-	10.270
Description: Develop, demonstrate, and qualify an XM1158 Small Caliber Ammo 7.62mm and 5.56mm ADVAP cartridges in order to defeat threat targets and provide overmatch capability versus a broad spectrum of hard targets.					
FY 2017 Base Plans: FY 2017 efforts will be focused on facilitization work and optimization of the full-up 7.62mm XM1158 cartridge design, as well as an evaluation of a trace cartridge design. Manufacturing process will be matured in order to support qualification test builds in FY 2018.					
Accomplishments/Planned Programs Subtotals	-	-	10.270	-	10.270

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army	Date: February 2016
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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u> <u>Base</u>	<u>FY 2017</u> <u>OCO</u>	<u>FY 2017</u> <u>Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PE 0603639A Project EC2: <i>Advanced Armor-Piercing (ADVAP) for Small Cal Ammunition</i>	5.280	-	7.700	-	7.700	3.800	6.900	-	-	0.000	23.680

Remarks

D. Acquisition Strategy

The 7.62mm and 5.56mm ADVAP programs will use a Government developed design and manufacturing processes. Multiple component contracts will be awarded to purchase raw materials and equipment. In FY 2016, design optimization and prototype manufacturing will occur in order to demonstrate TRL 6 for XM1158. Milestone B (MS-B) will occur in 1st QTR FY 2017 leading to fabrication and testing of qualification hardware. The 5.56mm cartridge will follow in FY 2018 under a similar strategy as 7.62mm.

E. Performance Metrics

N/A

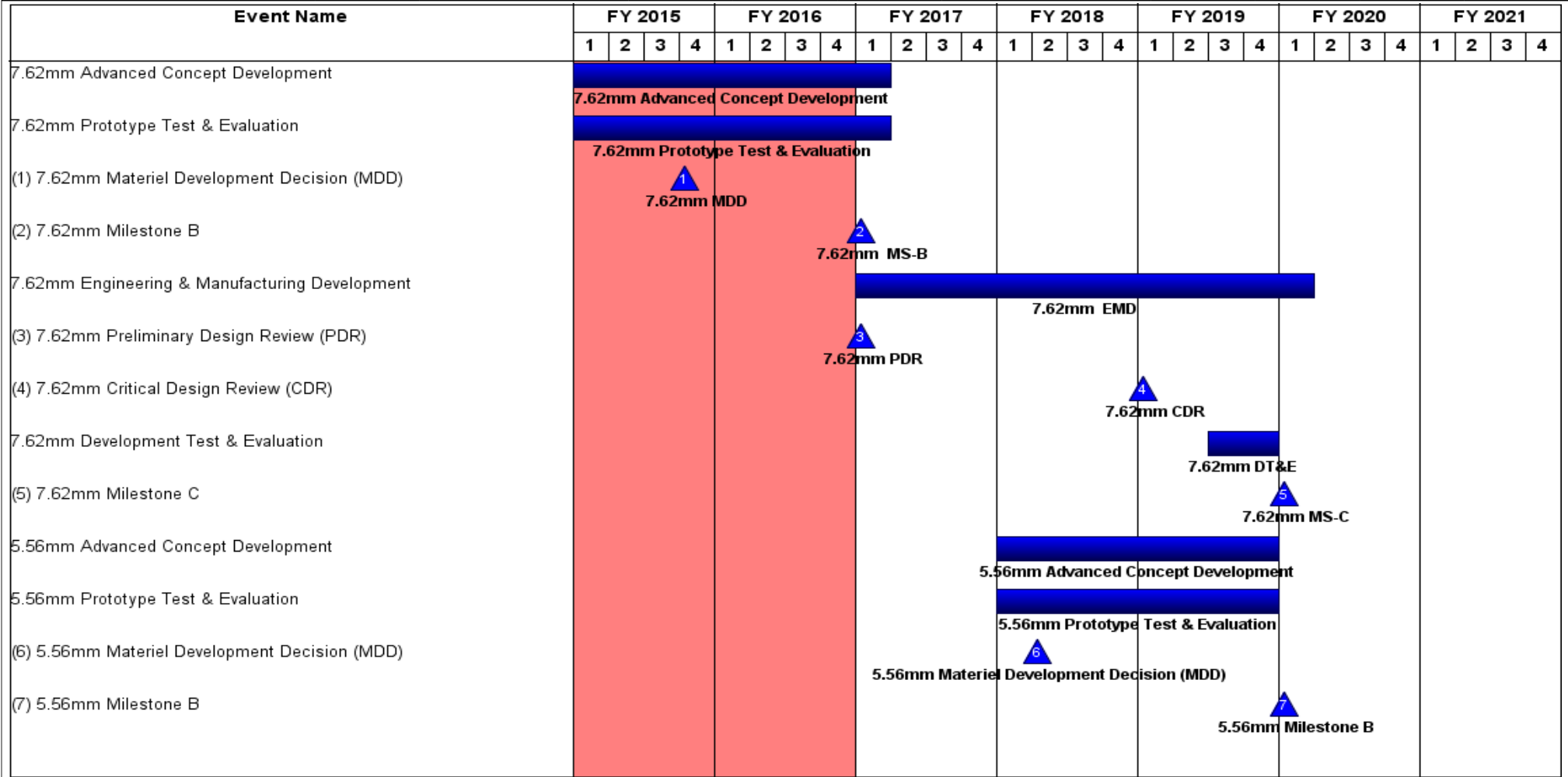
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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016			
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP5 I Adv Armor-Piercing (ADVAP) for Small Caliber Ammo							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Manager Maneuver Ammunition Systems (PM MAS) - Labor & Travel	Various	Picatinny Arsenal : New Jersey	0.000	-		-		0.200		-		0.200	Continuing	Continuing	Continuing
Raw Materials	TBD	TBD : TBD	0.000	-		-		1.200		-		1.200	Continuing	Continuing	Continuing
Facilitization	TBD	Picatinny Arsenal : New Jersey	0.000	-		-		4.400		-		4.400	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		5.800		-		5.800	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Armament Research Development and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : New Jersey	0.000	-		-		3.270		-		3.270	Continuing	Continuing	Continuing
Army Research Lab (ARL)	MIPR	Aberdeen Proving Grounds : Maryland	0.000	-		-		1.200		-		1.200	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		4.470		-		4.470	-	-	-
Project Cost Totals			0.000	-		0.000		10.270		-		10.270	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo
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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
5.56mm Engineering & Manufacturing Development	5.56mm EMD																											
(1) 5.56mm Preliminary Design Review (PDR)																	▲ 5.56mm											
(2) 5.56mm Critical Design Review (CDR)																									▲ 5.56mm			

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EP5 / <i>Adv Armor-Piercing (ADVAP) for Small Caliber Ammo</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
7.62mm Advanced Concept Development	1	2015	1	2017
7.62mm Prototype Test & Evaluation	1	2015	1	2017
7.62mm Materiel Development Decision (MDD)	4	2015	4	2015
7.62mm Milestone B	1	2017	1	2017
7.62mm Engineering & Manufacturing Development	1	2017	1	2020
7.62mm Preliminary Design Review (PDR)	1	2017	1	2017
7.62mm Critical Design Review (CDR)	1	2019	1	2019
7.62mm Development Test & Evaluation	3	2019	4	2019
7.62mm Milestone C	1	2020	1	2020
5.56mm Advanced Concept Development	1	2018	4	2019
5.56mm Prototype Test & Evaluation	1	2018	4	2019
5.56mm Materiel Development Decision (MDD)	2	2018	2	2018
5.56mm Milestone B	1	2020	1	2020
5.56mm Engineering & Manufacturing Development	1	2020	4	2023
5.56mm Preliminary Design Review (PDR)	4	2019	4	2019
5.56mm Critical Design Review (CDR)	4	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP6 / Lightweight Cartridge Case for Small Caliber Ammo			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EP6: <i>Lightweight Cartridge Case for Small Caliber Ammo</i>	-	0.000	0.000	1.290	-	1.290	3.808	3.820	7.829	4.826	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The 0604802A EP6, Lightweight Cartridge Case for Small Caliber Ammunition, program is not a new start. Funds in this program in FY 2017 are a realignment of funds from program 0603639A EL8, Lightweight Cartridge Case for Small Caliber Ammunition, for more efficient and effective program management. Lightweight Small Caliber Ammunition will develop and qualify lightweight cartridge case for 7.62mm ammunition and .50 caliber to replace current brass cartridge case.

A. Mission Description and Budget Item Justification

The Lightweight Small Caliber Ammunition (LSCA) program is a critical technology development in response to the 7.62mm and .50 Caliber Family of Ammunition Capabilities Development Documents (CDD). The goal of the LSCA Program is to reduce the Soldier load through reduction in ammunition weight. The LSCA Program will develop and field 7.62mm LSCA cartridges that will provide the same capabilities as the M80A1 and M62A1 cartridges. The LSCA cartridge will be designed to be compatible with all Army 7.62mm weapon systems, but specifically optimized to work in the M240 Machine Gun. After the 7.62mm cartridge is matured a .50 Caliber variant will be developed. FY 2017 funding will support the source selection evaluation process and the development of entrance and exit criteria for the Engineering and Manufacturing Development (EMD) Phase I efforts.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: 7.62mm Engineering and Manufacturing Development (EMD) for Lightweight Small Caliber Ammunition (LSCA)	-	-	1.290	-	1.290
Description: Develop, demonstrate, and quantify a Lightweight Small Caliber Ammunition (LSCA) 7.62mm capability that will provide an ammunition weight savings of twenty percent to the M240 gunner, assistant gunner and ammo bearer.					
FY 2017 Base Plans: FY 2017, the Government will conduct source selection in preparation for Phase I EMD effort.					
Accomplishments/Planned Programs Subtotals	-	-	1.290	-	1.290

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP6 / Lightweight Cartridge Case for Small Caliber Ammo

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

Line Item	FY 2015	FY 2016	FY 2017	FY 2017	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	Cost To	
			Base	OCO	Total					Complete	Total Cost
• PE 0603639A Project EL8: <i>Lightweight Cartridge Case for Small Caliber Ammunition</i>	-	2.400	1.280	-	1.280	2.500	-	-	-	0.000	6.180

Remarks

D. Acquisition Strategy

During Technology Maturation and Risk Reduction (TMRR), award up to two contracts for initial prototype evaluation of the M80A1 and M62A1 LSCA in FY 2016 via Department of Defense (DOD) Ordnance Technology Consortium (DOTC) resulting in 7.62mm LSCA TRL 6 Demonstrations. During Engineering and Manufacturing Development (EMD), award a two-phased Full and Open Competitive contract upon Milestone B approval. The Government intends to award up to two contracts for Phase I and downselect to one contractor for Phase II to manufacture test hardware to support Production Qualification Testing planned for FY 2021. Milestone C is planned for FY 2022 and .50 caliber will follow a similar approach starting in FY 2018.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EP6 / Lightweight Cartridge Case for Small Caliber Ammo							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Manager Maneuver Ammunition Systems (PM MAS) - Labor & Travel	Various	Picatinny Arsenal : New Jersey	0.000	-		-		0.205		-		0.205	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		0.205		-		0.205	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Armament Research Development and Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : New Jersey	0.000	-		-		0.450		-		0.450	Continuing	Continuing	Continuing
Army Research Lab (ARL)	MIPR	Aberdeen Proving Grounds : Maryland	0.000	-		-		0.265		-		0.265	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		0.715		-		0.715	-	-	-
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Aberdeen Test Center (ATC)	MIPR	Aberdeen Proving Grounds : Maryland	0.000	-		-		0.370		-		0.370	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		0.370		-		0.370	-	-	-
Project Cost Totals			0.000	-		0.000		1.290		-		1.290	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP6 / Lightweight Cartridge Case for Small Caliber Ammo
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
(1) 7.62mm Materiel Development Decision (MDD)					▲ 1 7.62mm MDD																							
7.62mm Prototype Contracts 1-2									■ 7.62mm Prototype Contracts 1-2																			
7.62mm Prototype Test & Evaluation													■ 7.62mm Prototype Test & Evaluation															
(2) 7.62mm Milestone B (MS-B)													▲ 2 7.62mm MS-B															
7.62mm Engineering and Manufacturing Development (EMD) Phase I																	■ 7.62mm EMD Phase I											
(3) 7.62mm Systems Requirement Review (SRR)																	▲ 3 7.62mm SRR											
(4) 7.62mm Preliminary Design Review (PDR)																					▲ 4 7.62mm PDR							
7.62mm Pre-Production Qualification Testing (PPQT)																					■ 7.62mm PPQT							
Down Select to 7.62mm Phase II Engineering and Manufacturing Development																					■ Down Select to 7.62mm Phase II EMD							
7.62mm Engineering and Manufacturing Development (EMD) Phase II																					■ 7.62mm EMD Phase II							
(5) 7.62mm Critical Design Review (CDR)																					▲ 5 7.62mm CDR							
7.62mm Production Qualification Testing (PQT)																					■ 7.62mm PQT							
(6) .50 Caliber Materiel Development Decision (MDD)													▲ 6 .50 Caliber MDD															

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP6 / Lightweight Cartridge Case for Small Caliber Ammo
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
.50 Caliber Prototype Test & Evaluation																	.50 Caliber Prototype Test & Evaluation											
(1) .50 Caliber Milestone B (MS-B)																					▲ .50 Caliber MS-B							
.50 Caliber Engineering and Manufacturing Development (EMD)																									.50 Caliber EMD			
(2) .50 Caliber Preliminary Design Review (PDR)																					▲ .50 Caliber PDR							
(3) .50 Caliber Critical Design Review (CDR)																									▲ .50 Caliber CDR			

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP6 / Lightweight Cartridge Case for Small Caliber Ammo

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
7.62mm Materiel Development Decision (MDD)	2	2016	2	2016
7.62mm Prototype Contracts 1-2	2	2016	2	2017
7.62mm Prototype Test & Evaluation	2	2017	3	2017
7.62mm Milestone B (MS-B)	3	2017	3	2017
7.62mm Engineering and Manufacturing Development (EMD) Phase I	3	2017	4	2019
7.62mm Systems Requirement Review (SRR)	4	2018	4	2018
7.62mm Preliminary Design Review (PDR)	3	2019	3	2019
7.62mm Pre-Production Qualification Testing (PPQT)	4	2019	1	2020
Down Select to 7.62mm Phase II Engineering and Manufacturing Development (EMD)	1	2020	1	2020
7.62mm Engineering and Manufacturing Development (EMD) Phase II	1	2020	2	2021
7.62mm Critical Design Review (CDR)	4	2020	4	2020
7.62mm Production Qualification Testing (PQT)	2	2021	3	2021
.50 Caliber Materiel Development Decision (MDD)	4	2018	4	2018
.50 Caliber Prototype Test & Evaluation	1	2019	4	2019
.50 Caliber Milestone B (MS-B)	4	2019	4	2019
.50 Caliber Engineering and Manufacturing Development (EMD)	1	2020	4	2021
.50 Caliber Preliminary Design Review (PDR)	2	2020	2	2020
.50 Caliber Critical Design Review (CDR)	2	2021	2	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP7 / Tunable Pyrotechnic Aircraft Countermeasure Flares			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EP7: Tunable Pyrotechnic Aircraft Countermeasure Flares	-	0.000	1.000	1.431	-	1.431	4.400	2.500	0.000	0.000	0.000	9.331
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The program will transition from 0603639 EB9.

A. Mission Description and Budget Item Justification

This project will support Integrated System Design (ISD), System Capability (SC) and Manufacturing Process Demonstrations (MPD) on current pyrotechnic munitions and tunable pyrotechnic aircraft counter measures and decoys. The project will also support ISD, SC and MPD on new expendable countermeasure munitions that will protect Army aircraft from advanced and current guided missile threats. Activities include modeling and simulation, flight testing, qualification testing, engineering to reduce size and weight, environmental considerations, safety enhancements, manufacturing enhancements, qualification of other service and foreign munitions that could meet current requirements, product improvements, insertion of new technologies to increase performance, and enhancement of current flare solutions for new and existing aircraft. Systems include impulse cartridges, pen flares, hand held signals, trip flares, simulators, marine markers, smoke pots, smoke grenades, rail road flares and other type of emergency/distress devices, aircraft expendables (to include Radio Frequency (RF) expendables), and primers used in munitions systems.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Improvements to countermeasure flares	-	1.000	1.431	-	1.431
Description: This program will develop improvements to legacy countermeasure flare solutions and qualify them for Army use.					
FY 2016 Plans: Develop Modeling and Simulation (M&S) parameters, conduct engineering and testing to development of alternative timing solutions that increase effectiveness for aircraft expendables in to M&S. Modify current countermeasure payloads to increase decoy effectiveness.					
FY 2017 Base Plans: Conduct flight effectiveness testing on Army platforms based on M&S results. Generate necessary documentation to support Airworthiness (AWR) and fielding of new countermeasure solutions.					
Accomplishments/Planned Programs Subtotals	-	1.000	1.431	-	1.431

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army	Date: February 2016
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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP7 / Tunable Pyrotechnic Aircraft Countermeasure Flares
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u> <u>Base</u>	<u>FY 2017</u> <u>OCO</u>	<u>FY 2017</u> <u>Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603639A - Tank and Medium Caliber: <i>EB9 - Tunable Pyrotechnic</i> <i>Aircraft Countermeasure Flares</i>	0.850	3.000	3.400	-	3.400	-	-	-	-	0	7.250

Remarks

D. Acquisition Strategy

The Acquisition strategy is under development and will be approved by the Milestone Decision Authority (MDA) in 3rdQ FY2016. It is anticipated that these items will be restricted to the National Technology and Industrial Base (NTIB).

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP7 / Tunable Pyrotechnic Aircraft Countermeasure Flares
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Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	MIPR	PM CCS : Picatinny Arsenal	0.000	-		0.193		0.231	Jan 2017	-		0.231	0	0.424	0
Subtotal			0.000	-		0.193		0.231		-		0.231	0.000	0.424	0.000

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	MIPR	ARDEC : Picatinny Arsenal	0.000	-		0.607		-		-		-	0	0.607	0
Subtotal			0.000	-		0.607		-		-		-	0.000	0.607	0.000

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test & Evaluation	MIPR	AED : Redstone Arsenal	0.000	-		0.200		1.200	Apr 2017	-		1.200	0	1.400	0
Subtotal			0.000	-		0.200		1.200		-		1.200	0.000	1.400	0.000

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		0.000	-	1.000	1.431	-	1.431	0.000	2.431	0.000

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP7 / Tunable Pyrotechnic Aircraft Countermeasure Flares
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Generate Countermeasure Flare Modeling & Simulation Parameters																												
Develop M&S countermeasure solutions and payload configurations																												
Test & Evaluation of countermeasure solutions																												
(1) Cloud CM Milestone C																	▲											

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EP7 / Tunable Pyrotechnic Aircraft Countermeasure Flares

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Generate Countermeasure Flare Modeling & Simulation Parameters	2	2016	3	2016
Develop M&S countermeasure solutions and payload configurations	4	2016	3	2017
Test & Evaluation of countermeasure solutions	3	2017	1	2019
Cloud CM Milestone C	3	2019	3	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EU4 / 40mm High Velocity High Explosive Airburst (HEDP)			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EU4: 40mm High Velocity High Explosive Airburst (HEDP)	-	0.000	0.000	0.303	-	0.303	2.809	6.820	6.828	6.825	0.000	23.585
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
PE 0604802A, Project EU4, 40mm High Velocity High Explosive Airburst (HEAB) is a new start.

A. Mission Description and Budget Item Justification

The Army has identified a capability gap to defeat enemy personnel in defilade using the MK19 weapons system. The draft Capability Development Document (CDD) has been prepared and is expected to be approved in FY 2017. The improved 40mm High Velocity HEAB cartridge, with airburst fuze, allows the warfighter to effectively engage multiple targets and provide the grenadier with a higher probability of defeating personnel targets in defilade positions, increasing Soldier Survivability. FY 2017 dollars support the development of the Acquisition Strategy, Milestone B, and procurement support documents.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Pre Engineering Manufacturing Development Activities	-	-	0.303	-	0.303
Description: After Milestone B approval but before the start of EMD, pre-award activities need to be accomplished.					
FY 2017 Base Plans: Funds in FY 2017 will support key accomplishments to include the development/approval of Acquisition Strategy, Milestone B, and procurement support document.					
Accomplishments/Planned Programs Subtotals	-	-	0.303	-	0.303

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

N/A

Remarks

D. Acquisition Strategy

The 40mm High Velocity High Explosive Airburst (HEAB) cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. As part of the acquisition strategy, two contractors will be awarded EMD contracts. After 12 months of design and development, the contractors will deliver their hardware samples for a shoot off competition. The government will evaluate the results, downselect and award one final EMD contract to mature the winning

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EU4 / <i>40mm High Velocity High Explosive Airburst (HEDP)</i>
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contractor's design. The contractor will finalize the HEAB cartridge design through a series of engineering tests and culminating in a Developmental Test & Evaluation. The test results will support the documentation for Milestone C, which is scheduled for 3Q FY 2021. After EMD is complete, a contract will be awarded for Low Rate Initial Production (LRIP) and two production year options.

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EU4 / 40mm High Velocity High Explosive Airburst (HEDP)
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021																			
	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																
Milestone B Support Documents					Documentation																																							
(1) Milestone B 40mm (HEAB)																	MS-B ▲ ¹																											
(2) Engineering Manufacturing Development Contract Award																	EMD Contract Award ▲ ²																											
Engineering Manufacturing Development																	EMD																											
Shoot Off/Bid Sample Test																					Shoot Off/Bid Sample Test																							
(3) Test Readiness Review DET																									TRR DET ▲ ³																			
Development Engineering Test																									DET																			
(4) Test Readiness Review DT&E																													TRR DT&E ▲ ⁴															
Development Test & Evaluation																													DT&E															
(5) MS-C																																	MS-C ▲ ⁵											
(6) Production Contract Award																																					Production Contract Award ▲ ⁶							

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EU4 I 40mm High Velocity High Explosive Airburst (HEDP)

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Milestone B Support Documents	2	2017	2	2018
Milestone B 40mm (HEAB)	2	2018	2	2018
Engineering Manufacturing Development Contract Award	3	2018	3	2018
Engineering Manufacturing Development	3	2018	1	2021
Shoot Off/Bid Sample Test	1	2019	1	2019
Test Readiness Review DET	4	2019	4	2019
Development Engineering Test	4	2019	1	2020
Test Readiness Review DT&E	3	2020	3	2020
Development Test & Evaluation	3	2020	4	2020
MS-C	1	2021	1	2021
Production Contract Award	2	2021	2	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EU5 / .50 Caliber All-Purpose Tactical cartridge (APTC)
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EU5: .50 Caliber All-Purpose Tactical cartridge (APTC)	-	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	2.000	0.000	2.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

NA

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EU6 / 155mm High Explosive Extended Range Artillery
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
<i>EU6: 155mm High Explosive Extended Range Artillery</i>	-	0.000	0.000	0.000	-	0.000	0.000	7.000	5.000	3.000	0.000	15.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

NA

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EU7 / Enhanced Lethality Cannon Munitions			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EU7: Enhanced Lethality Cannon Munitions	-	0.000	0.000	0.000	-	0.000	0.000	8.000	8.000	8.000	0.000	24.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

NA

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EU8 / Improved Multi-Option Fuze			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EU8: Improved Multi-Option Fuze	-	0.000	0.000	0.000	-	0.000	8.000	8.000	10.000	0.000	0.000	26.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

NA

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army										Date: February 2016		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EW1 / 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
EW1: 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203	-	0.000	0.000	0.353	-	0.353	5.308	9.732	9.023	7.205	0.000	31.621
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2017, the program will transition from 0603639A 694, Medium Caliber Ammunition. Funds in the 0604802A EW1 40mm IRAP program in FY 2017 are a realignment of funds from program 0603639A 694, Medium Caliber Ammunition for more efficient, effective program management.

A. Mission Description and Budget Item Justification

The 40mm Low Velocity (LV) Increased Range Anti-Personnel (IRAP) tactical cartridge allows the warfighter to effectively engage multiple targets, at increased ranges using the 40mm M203 and M320 Grenade Launchers. The IRAP cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions at increased ranges with greater accuracy and lethality. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel or achieve a mobility kill against unarmored vehicles at increased ranges beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. IRAP is a new capability identified as a Warfighter requirement in the Capability Development Document, 40mm, Low Velocity Family of Ammunition Annex A1, Increased Range Anti-Personnel Cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges increasing Soldier Survivability. FY 2017 supports Milestone B approval, Request for Proposal (RFP) preparation, Source Selection Planning, Government Technical Development and Cooperative Research and Development Agreement (CRADA) Testing. Engineering, Manufacturing Development will commence in FY 2017.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Engineering Manufacturing Development Activities	-	-	0.050	-	0.050
Description: After Milestone B approval but before the start of EMD, pre-award activities need to be accomplished.					
FY 2017 Base Plans:					
FY 2017 primary activities include Milestone B approval and Bid Sample Test competition. In preparation for contract award, Request for Proposal (RFP) preparation, release and review of proposals will occur along with source selection.					
Title: Engineering Manufacturing Development Phase I	-	-	0.303	-	0.303
Description: 40mm IRAP program will enter EMD Phase I in the 4th Quarter FY 2017					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army	Date: February 2016
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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EW1 / 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
FY 2017 Base Plans: FY 2017 initiate EMD Phase I with one or more contract awards for competing prototypes.					
Accomplishments/Planned Programs Subtotals	-	-	0.353	-	0.353

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603639A 694: <i>Medium Caliber Ammunition 0603639A 694</i>	-	-	2.170	-	2.170	-	-	-	-	0.000	2.170

Remarks

D. Acquisition Strategy
The IRAP cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. As part of the pre-EMD activities, Government Technical Development Testing and Cooperative Research and Development Agreement (CRADA) Testing with contractors will occur to evaluate potential designs. Within funding constraints, one or more Cost Plus contracts will be awarded for EMD. The Government plans to downselect to one contractor for LRIP and full rate production.

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				EW1 / 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Manager Maneuver Ammunition Systems (PM MAS) labor and travel	MIPR	Picatinny Arsenal : NJ	0.000	-		-		0.303		-		0.303	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		0.303		-		0.303	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
Armament Research Development Engineering Center (ARDEC)	MIPR	Picatinny Arsenal : NJ	0.000	-		-		0.050		-		0.050	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		0.050		-		0.050	-	-	-
Project Cost Totals			0.000	-		0.000		0.353		-		0.353	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EW1 / 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021															
	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												
Tech Demo/CRADA Testomg					Testing																																			
(1) Milestone B (IRAP)													MS-E1																											
Engineering Manufacturing Development																	EMD																							
(2) Test Readiness Review DET I (IRAP)																					TRR DET 2																			
Development Engineering Test Phase I																					DET 1																			
(3) Test Readiness Review DET II (IRAP)																									TRR DET 2															
Development Engineering Test Phase II																									DET 2															
(4) Test Readiness Review DT&E (IRAP)																													TRR DT&E											
Developmental Test & Evaluation																													DT&E											
(5) MS-C (IRAP)																																	MS-C							
Production Contract (IRAP)																																	Production Contract							

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) EW1 / 40mm Inc Range Anti-Pers Ammo(IRAP)HEAB f/M203

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Tech Demo/CRADA Testomg	1	2017	2	2017
Milestone B (IRAP)	4	2017	4	2017
Engineering Manufacturing Development	3	2018	3	2021
Test Readiness Review DET I (IRAP)	2	2019	2	2019
Development Engineering Test Phase I	2	2019	2	2019
Test Readiness Review DET II (IRAP)	1	2020	1	2020
Development Engineering Test Phase II	2	2020	2	2020
Test Readiness Review DT&E (IRAP)	1	2021	1	2021
Developmental Test & Evaluation	1	2021	2	2021
MS-C (IRAP)	3	2021	3	2021
Production Contract (IRAP)	4	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) S36 / Precision Guidance Kit
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
S36: Precision Guidance Kit	-	6.881	9.530	15.957	-	15.957	14.772	5.860	8.081	8.297	0.000	69.378
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program funds engineering development of precision guidance systems applicable to Indirect Fire artillery weapon systems. The Precision Guidance Kit (PGK) is a Global Positioning System guidance kit with fuzing functions. PGK provides near precision accuracy and effectiveness for 155mm High Explosive artillery projectiles. PGK improves the accuracy of existing artillery ammunition by correcting the trajectory of projectiles to their designated target location. Precision guidance systems effectively reduce target delivery error reducing the number of rounds required to conduct a fire mission. On-going development addresses performance in jammed environments as well as the implementation of an M-Code capable GPS receiver.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>Title: Contractor Engineering and Manufacturing Development</p> <p>Description: Contractor Engineering and Manufacturing Development</p> <p>FY 2015 Accomplishments: Design maturation of PGK system and components to achieve Anti-Jam capability. This includes a preliminary design review, performance modeling, bench testing and GPS receiver development.</p> <p>FY 2016 Plans: GPS Design maturation of a PGK with Anti-Jam capability including prototype development and testing.</p> <p>FY 2017 Base Plans: GPS Design maturation of a PGK with Anti-Jam capability including critical design review.</p>	4.092	6.050	12.707	-	12.707
<p>Title: Government and Engineering Support</p> <p>Description: Continue Engineering Support</p> <p>FY 2015 Accomplishments: Engineering Support of Anti-Jam Development</p> <p>FY 2016 Plans: Engineering Support of Anti-Jam Development.</p> <p>FY 2017 Base Plans:</p>	0.994	2.480	2.250	-	2.250

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) S36 / Precision Guidance Kit

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Engineering Support of Anti-Jam Development.					
Title: Continue Development/Operational Testing	1.795	1.000	1.000	-	1.000
Description: Continue Development/Operational Test					
FY 2015 Accomplishments: Operational Test of PGK increment 1 was completed in 3Q FY 2015.					
FY 2016 Plans: Developmental Testing of PGK technologies with Anti-Jam capability.					
FY 2017 Base Plans: Developmental Testing of PGK prototypes in a jammed environment with Anti-Jam capability.					
Accomplishments/Planned Programs Subtotals	6.881	9.530	15.957	-	15.957

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

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• E99250: Procurement of Ammunition Army: Precision Guidance Kit (PGK)	50.568	55.324	45.941	18.221	64.162	48.340	58.760	60.380	67.222	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Precision Guidance Kit (PGK) is a Global Positioning System (GPS) guidance kit with fuzing functions for 155mm High Explosive (HE) artillery projectiles. PGK provides near precision accuracy and effectiveness for 155mm HE projectiles. Using an integrated GPS receiver, the PGK corrects the inherent errors associated with ballistic firing solutions and reduces the number of artillery projectiles required to execute the mission. The current PGK Increment qualified the PGK for the M795 and M549A1 HE projectiles. The Acquisition Strategy/Acquisition Plan for the PGK program was approved by the Milestone Decision Authority on 20 October 2005, subsequently revised and approved on 14 December 2012. Alliant Techsystems (ATK) was competitively awarded the Engineering and Manufacturing Development (EMD) phase in May 2007 following a Technology Development Demonstration. Approval to initiate the procurement of Low Rate Initial Production (LRIP) occurred at Milestone C in March 2013. Initial Operational Test and Evaluation (IOT&E) was completed 3Q FY 2015, Full Material Release (FMR) was approved 1Q FY 2016, Full Rate Production (FRP) decision is planned for 2Q FY 2016, and Initial Operational Capability (IOC) is scheduled for 2Q FY 2016. Continued development efforts support integration of GPS Anti-Jam capability and M-Code compliance with Public Law 111-383 Sec 913.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) S36 / <i>Precision Guidance Kit</i>

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) S36 / Precision Guidance Kit
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Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Support	MIPR	Camber : Mt Arlington, NJ	1.936	-		-		-		-		-	0	1.936	1.936
LNO Support - Ft. Sill	MIPR	US ARMY Field Artillery Center : Ft. Sill, OK	0.065	0.065	Jul 2015	0.050	Jul 2016	-		-		-	0	0.180	0.180
Miscellaneous Support Contract	MIPR	MITRE Corporation : Fort Monmouth, NJ	0.600	-		-		-		-		-	0	0.600	0.600
PGK Parallel Studies and Analysis Support -	MIPR	Command and Control Directorate : Ft Monmouth, NJ	0.300	-		-		-		-		-	0	0.300	0.300
Subtotal			2.901	0.065		0.050		-		-		-	0.000	3.016	3.016

Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
PGK TD Contract	C/CPAF	Alliant Techsystems (ATK) : Plymouth, MN	5.279	-		-		-		-		-	0	5.279	5.279
PGK TD Contract	C/CPAF	BAE : Minneapolis, MN	3.103	-		-		-		-		-	0	3.103	3.103
Soft Recovery Modules	MIPR	SubSystems Technology : Rosslyn, VA	0.116	-		-		-		-		-	0.000	0.116	0.116
PGK EMD & Phase 1-2 (Reliability Failure/Root Cause Analysis)	C/CPAF	Alliant Techsystems (ATK) : Plymouth, MN	53.947	-		-		-		-		-	0	53.947	53.947
PGK EMD - Phase 3a to 5	C/FFP	Alliant Techsystems (ATK) : Plymouth, MN	25.117	-		-		-		-		-	0	25.117	25.117
DOTC - PGK GPS Anti-Jam Development	C/CPFF	Alliant Techsystems (ATK) : Plymouth, MN	16.226	4.092	Nov 2015	7.000	Apr 2016	12.707	Jan 2017	-		12.707	0	40.025	40.025

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 5				PE 0604802A / Weapons and Munitions - Eng Dev				S36 / Precision Guidance Kit							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DOTC - GDOTS - Engineering & Technology Assessment. Low Cost Roll Control Solutions	C/CPFF	General Dynamics Ordnance & Tactical Systems : Bothell, WA	2.093	-		-		-		-		-	0	2.093	2.093
DOTC - BAE Systems - Engineering & Technology Assessment. Low Cost Course Correction solutions.	C/CPFF	BAE/Rokar : Minneapolis, MN	0.500	-		-		-		-		-	0	0.500	0.500
High Angle Software Configuration	C/CPFF	Raytheon : Ft Wayne, IN	0.105	-		-		-		-		-	0	0.105	0.105
Subtotal			106.486	4.092		7.000		12.707		-		12.707	0.000	130.285	130.285
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
PM Office	PO	PM CAS : Picatinny, NJ	10.763	0.661	Dec 2014	0.670	Jan 2016	0.670	Dec 2016	-		0.670	0	12.764	12.764
Government Engineering Support	MIPR	ARDEC : Picatinny, NJ	28.598	0.220	Jan 2015	1.480	Jan 2016	1.500	Jan 2017	-		1.500	0	31.798	31.798
Jammer Support	MIPR	Electronic Proving Ground : Ft Huachuca, AZ	0.288	0.028	Jun 2015	0.080	Jun 2016	0.080	Jun 2017	-		0.080	0	0.476	0.476
ATEC Support	MIPR	Army Test and Evaluation Command : Aberdeen, MD	0.005	0.020	Jun 2015	-		-		-		-	0	0.025	0.025
Subtotal			39.654	0.929		2.230		2.250		-		2.250	0.000	45.063	45.063

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) S36 / Precision Guidance Kit
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Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Component Air Gun/ Railgun Testing	MIPR	ARDEC : Picatinny, NJ	0.317	0.020	Dec 2015	-		-		-		-	0	0.337	0.337
Other Development Testing	MIPR	Various : Various	1.725	0.044	Feb 2015	-		-		-		-	0	1.769	1.769
System Development Testing Increment 1	MIPR	Yuma Proving Ground : Yuma, AZ	10.442	-		-		-		-		-	0	10.442	10.442
Limited User Test	MIPR	Yuma Proving Ground : Yuma, AZ	1.631	-		-		-		-		-	0	1.631	1.631
Development Testing for GPS Anti-Jam	MIPR	Yuma Proving Ground : Yuma, AZ	0.590	-		0.250	Jan 2016	1.000	Jan 2017	-		1.000	0	1.840	1.840
Initial Operational Test & Evaluation - Increment 1	MIPR	Yuma Proving Ground : Yuma, AZ	0.000	1.000	Feb 2015	-		-		-		-	0	1.000	1.000
Initial Operational Test & Evaluation - Troop Support	MIPR	Ft. Sill, OK : Ft. Sill, OK	0.000	0.731	Feb 2015	-		-		-		-	0	0.731	0.731
Cold Region Testing	MIPR	Cold Region Test Center : Yuma, AZ	0.300	-		-		-		-		-	0	0.300	0.300
Airdrop Testing	MIPR	Yuma Proving Ground : Yuma, AZ	0.200	-		-		-		-		-	0	0.200	0.200
Subtotal			15.205	1.795		0.250		1.000		-		1.000	0.000	18.250	18.250

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	164.246	6.881	9.530	15.957	-	15.957	0.000	196.614	196.614

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army **Date:** February 2016

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) S36 / Precision Guidance Kit
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Event Name	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
First Article Test (FAT)	FAT																											
Initial Operational Test and Evaluation (IOT&E)	IOT&E																											
(1) Full Materiel Release					1 FMR																							
(2) Full Rate Production					2 FRP																							
(3) Initial Operational Capability (IOC)					3 IOC																							
Anti-Jam Prototype Development Testing					AJ Prototype Development Testing																							
(4) Anti-Jam / M-Code Critical Design Review													4 AJ / M-Code CDR															
Anti-Jam / M-Code Contractor Verification													AJ / M-Code Contractor Verification															
Anti-Jam / M-Code Government Qualification																	AJ / M-Code Government Qualification											
Initial Operational Test and Evaluation (IOT&E) - Anti-Jam / M-Code																					IOT&E							

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) S36 / <i>Precision Guidance Kit</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
First Article Test (FAT)	1	2015	1	2015
Initial Operational Test and Evaluation (IOT&E)	2	2015	3	2015
Full Materiel Release	1	2016	1	2016
Full Rate Production	2	2016	2	2016
Initial Operational Capability (IOC)	2	2016	2	2016
Anti-Jam Prototype Development Testing	2	2015	2	2018
Anti-Jam / M-Code Critical Design Review	3	2018	3	2018
Anti-Jam / M-Code Contractor Verification	3	2018	2	2020
Anti-Jam / M-Code Government Qualification	3	2020	3	2021
Initial Operational Test and Evaluation (IOT&E) - Anti-Jam / M-Code	4	2021	4	2021

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