Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army											Date: May 2017	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	-	42.272	42.096	41.452	-	41.452	42.209	25.451	10.054	6.354	Continuing	Continuing
656: *120mm Cartridge (Advanced Multipurpose-AMP)*	-	26.485	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	26.485
694: *Medium Caliber Ammunition*	-	0.000	2.170	1.000	-	1.000	6.200	2.400	0.000	0.000	0.000	11.770
EB8: *OWL for Small Caliber Ammunition*	-	2.001	2.166	1.200	-	1.200	2.200	2.000	0.000	0.000	Continuing	Continuing
EB9: *Tunable Pyrotechnic Aircraft Countermeasure Flares*	-	1.662	2.368	1.000	-	1.000	1.600	0.000	0.000	2.600	0.000	9.230
EC2: *Adv Armor-Piercing (ADVAP) for Small Cal Ammo*	-	7.395	0.000	0.000	-	0.000	3.800	6.900	0.000	0.000	Continuing	Continuing
EC3: *Ammunition Logistics Prototyping*	-	3.430	2.017	1.677	-	1.677	2.209	2.151	2.054	3.754	0.000	17.292
EL7: *Reduced Range Ammunition*	-	0.000	2.166	7.600	-	7.600	7.700	0.000	0.000	0.000	Continuing	Continuing
EL8: *LIGHTWEIGHT CARTRIDGE CASE FOR SMALL CALIBER*	-	1.299	1.280	2.500	-	2.500	0.000	0.000	0.000	0.000	0.000	5.079
EU1: *Enhanced Lethality Cannon Munitions*	-	0.000	9.866	10.000	-	10.000	0.000	0.000	0.000	0.000	0.000	19.866
EU2: *Improved Multi-Option Fuze (iMOFA/iMOFM)*	-	0.000	7.892	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.892
FA5: *Assured Precision Weapons and Munitions*	-	0.000	10.171	13.000	-	13.000	15.000	12.000	8.000	0.000	Continuing	Continuing
FG1: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	-	0.000	2.000	1.000	-	1.000	0.000	0.000	0.000	0.000	0.000	3.000
XT5: *30mm Anti-Personnel and Counter UAS*	-	0.000	0.000	2.475	-	2.475	3.500	0.000	0.000	0.000	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603639A *I Tank and Medium Caliber Ammunition*

Note

In FY 2018, PE 0603639A Project XT5 is a new start program.

A. Mission Description and Budget Item Justification

The Tank and Medium Caliber Ammunition Program Element (PE) encompasses a comprehensive program to develop, rapidly transition to production, and field advanced weapons and munitions. These programs will ensure continued battlefield overmatch and lethality of U.S. maneuver forces against the full range of modern battlefield threats. To achieve this, Weapons and Munitions Engineering Development Program will identify and develop promising technologies through competitive development and streamlined acquisition procedures.

Project 656: 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 M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. FY 2016 supported multiple contracts with competing prototypes in Phase 1 of 2 for Engineering and Manufacturing Development (EMD).

Project 694: Joint Light Tactical Family of Vehicles (FoV): Develop and qualify 30x113mm ammunition for the Joint Light Tactical Vehicle (JLTV) which will serve as the Infantry Brigade Combat Team Light Reconnaissance Vehicle (RV). This is an Army directed requirement to enhance the operational effectiveness of the JLTV-RV by increasing precision and lethality capability to defeat personnel and material targets using a 30x113mm weapon system. Qualify the linked M788 and M789 ammunition and develop airburst capable munitions for use with the Light Weight 30mm Link Fed Chain Gun.
The HEAB cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. As part of the pre-EMD activities, Cooperative Research and Development Agreement (CRADA) Testing with contractors will occur to evaluate potential designs. For EMD, two Full and Open competitive contracts will be awarded. After Developmental Test & Evaluation (DT&E) the government will down-select to a single contractor for Low Rate Initial Production (LRIP) and two production year options.

Project EB8: The One Way Luminescence (OWL) program is a critical technology development in response to the 7.62mm and 5.56mm Families of Ammunition Capabilities Development Documents (CDD). Current small caliber ammunition tracer rounds are a pyrotechnic tracer mix allowing enemy forces to see the trace round and track its trajectory back to the shooter. The OWL program's objective is to develop and field a full day/night tracer round to replace the current pyrotechnic cartridges with trace cartridges that are only visible to the shooter and soldiers in close proximity, increasing soldier survivability. 7.62mm is the immediate focus followed by 5.56mm OWL cartridges. FY 2018 funding supports finalizing 7.62mm concept development. FY 2018 funding also supports maturing the 5.56mm OWL technology, procuring bullet components, tracer material and testing evaluation in order to attain a Technology Level Readiness (TRL) of 6 in FY 2020; and support of Engineering and Manufacturing Development (EMD) contract development necessary for a FY 2021 Milestone B (MS B).

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603639A *I Tank and Medium Caliber Ammunition*

Project EB9: The Tunable Pyrotechnic Aircraft Countermeasure Flares program supports the advanced development activities and technology demonstrations of the Aviation Airborne Expendable Countermeasure (AAECM). These advanced decoys are necessary to address emerging threats and capabilities deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. These efforts will evaluate integrated technologies and countermeasure prototype systems in realistic operating test environments. Prototypes will help expedite technology transition from the laboratory to operational use by demonstrating component and subsystem maturity prior to integration into major and complex Army aircraft platforms. These expendable countermeasures systems are an essential part of survivability equipment for Army aircraft. Army RDT&E efforts are coordinated with the PEO Aviation and its platform PMs with PM Aircraft Survivability Equipment (ASE) to address emerging JUONS from theatre.

Project EC2: 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 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 cartridge will be optimized for use in the M240 Machine Gun.

Project EC3: The Ammunition Logistics Prototyping program 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. FY2018 dollars will support the completion of system component integration and verification testing and operational demonstration for the environmental health monitoring system, the completion of prototype development and verification testing of a next generation temperature/humidity sensor, and the maturation of the design and fabrication of prototype plastic polymer rectangular containers for developmental 5.56mm ammunition.

Project EL7: The small caliber Reduced Range Ammunition (RRA) program is a critical technology development in response to the 7.62mm and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. FY 2018 dollars support Technology Maturation and Risk Reduction in preparation for a 7.62mm TRL 6 demonstration and preparation for Milestone B (MS-B). Leverage lessons learned from Marine Corp .50 Caliber Reduced Range Ammunition effort. Purchase test articles and perform engineering tests to qualify the .50 Caliber Marine Corps design/ammunition for Army use.

Project EL8: The Lightweight Small Caliber Ammunition (LSCA) program is a critical technology development in response to the 7.62mm 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. FY 2018 funding will support the development of the preliminary lightweight cartridge design to include a Systems Requirement Review, Preliminary Design Review, and manufacturing of Pre-Validation Test Samples.

Project EU1: The Enhanced Lethality Cannon Munitions (ELCM) project will evaluate, develop, mature, and demonstrate new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to Engineering Manufacturing Development (EMD). The ELCM project will prototype and accelerate the maturation of enhanced lethality technologies, such as Lithographic Fragmentation Technology (LFT), for 155mm cannon artillery munition. The ELCM project will accelerate the development and maturation of LFT for subsequent integration on the 155mm XM1128 high explosive projectile per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition, 22 December 2016. ELCM addresses requirements for increased lethality above the current U.S. Army go-to-war 155mm high explosive unitary projectiles, the M795 Insensitive Munition. FY 2018 funding will support prototyping of enhanced lethality technologies applicable to 155mm cannon artillery munitions.

Project EU2: The Improved Multi-Option Fuze (iMOFA/iMOFM) project will identify, develop, prototype, and demonstrate new improved multi-option fuze technologies, components, and subsystems based on Government-owned Next Generation Proximity Sensor (NGPS) capabilities with built-in exportability attributes previously matured via OSD-sponsored techbase efforts under the Joint Fuze Technology Program and Defense Exportability Features (DEF) Congressional Pilot Program. This project will support technology maturation and risk reduction, and will evaluate and analyze producibility, affordability, safety, and compatibility of these prototype potential materiel solutions in representative realistic performance-related developmental tests. Up to four potential NGPS with built-in DEF technology prototype solutions for improved multi-option fuzing systems from Government and/or Industry will be prototyped and evaluated. This project will enable fact-based analysis of new Government-owned height of burst/proximity fuzing alternatives that are resistant to enemy countermeasures and reverse engineering threats, quantify their effectiveness, reduce integration risk, and support transition into existing/new artillery/mortar fuzes and munitions.

Project FA5: The Assured Precision Weapons and Munitions project is a continuation of FY14-16 efforts initiated under 644120A-ED5. The objective of this advanced component development and prototyping effort is to identify, evaluate, mature, test, and demonstrate various assured precision prototype technologies in weapons and munitions systems to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent Program of Record (PoR) integration risk. Assured Precision Weapons and Munitions are an integral part of US military strategy and continue to enable combat overmatch and dominance across the Land Component battlespace. Unhindered access to trusted Positioning, Navigation, and Timing (PNT) information under conditions where existing space based PNT (i.e. P(Y)-Code Global Positioning System (GPS)) may be limited or denied has created the need to develop, prototype, and evaluate new/emerging Assured PNT capabilities (including M-Code GPS and Pseudolites) into both PGMs and Weapons operating in a complex system-of-systems environment. This imperative is reinforced by Public Law 111-383 Section 913 which mandates the use of Air Force-developed M-Code GPS capabilities in all systems fielded FY2018 and beyond unless a waiver is obtained from the Secretary of Defense. As such, both precision weapon and munition PoRs must coordinate with the development and technology delivery activities of the Air Force's Military GPS User Equipment (MGUE) program and the Army's Assured PNT program to protect and insure critical precision-based Joint warfighting capabilities as well as maximizing effectiveness and efficiency of US taxpayer investments across multiple Lethality portfolios. FY 2018 funding will support requirements for MGUE Increment 2 and Pseudolite related technology maturity for Assured PNT Milestone decisions, analysis and evaluation of various assured precision prototype technologies in weapons and munitions systems to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent Program of Record (PoR) integration risk, including specific focus on Pseudolite related weapons and munitions integration risk mitigation and

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army	Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603639A *I Tank and Medium Caliber Ammunition*

Emplaced Weapon Use-Case needed for Precision Fires, and development, prototyping, and evaluation of new/emerging Assured PNT capabilities (including M-Code GPS and Pseudolites) for PGK, M777A2, and M119A3 when operating in a complex heterogeneous system-of-systems environment, and continue prototyping/ evaluation in support of a subsequent M-Code/Pseudolite capable setter.

Project FG1: The Cannon-Delivered Area Effects Munitions (C-DAEM) project will analyze, identify, develop, prototype, and demonstrate 155mm Cannon Artillery munition area effects capability. C-DAEM are envisioned as a suite of 155mm artillery munitions, to provide U.S. ground forces with a capability to effectively engage area targets to destroy, neutralize, and/or suppress threat platforms and facilities, and deny threat forces full operational freedom within the targeted area. Initial objective values for C-DAEM would meet Dual Purpose Improved Conventional Munitions (DPICM) effects capabilities against personnel and light vehicles and exceed DPICM effects capabilities against armor. An Analysis of Alternatives (AoA) will be completed to best inform necessary area effect lethality requirements. The project addresses requirements from the U.S. Army adopted U.S. Marine Corps (USMC) C-DAEM Initial Capabilities Document (ICD) [AROC adopted 20 October 2016, JROC approved 11 May 2016]. The approved C-DAEM ICD as an Army requirement is located in the Capabilities and Army Requirements Documents number 0438. The Joint Staffing Designator is Joint Requirement Oversight Council (JROC) Interest. FY 2018 funding will support the completion of the C-DAEM AoA to inform C-DAEM required capabilities and the Milestone A review with MDA.

Project XT5: Lightweight 30mm x 113mm (LW30) Airburst ammunition is a new capability identified as a Warfighter requirement. The LW30 airburst cartridge improves the warfighter's probability in defeating anti-personnel and anti-materiel targets due to increased lethality. Airburst capability allows a much higher probability of achieving a first burst kill against enemy personnel targets in the open. The LW30 will retain its dual purpose warhead, allowing it to continue to defeat light armored threats through point detonation. The cartridge provides increased lethal effects against personnel & soft-skin vehicular targets increasing Soldier Survivability while troops are in contact engagements and decreases the required number of rounds to reach the desired lethal effects. FY 2018 supports Technology Maturation and Risk Reduction effort.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	46.749	40.096	46.663	-	46.663
Current President's Budget	42.272	42.096	41.452	-	41.452
Total Adjustments	-4.477	2.000	-5.211	-	-5.211
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-4.477	2.000	-5.211	-	-5.211

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) 656 / *120mm Cartridge (Advanced Multipurpose-AMP)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
656: *120mm Cartridge (Advanced Multipurpose-AMP)*	-	26.485	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	26.485
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 breech modification, the same required by the 120mm M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. FY 2016 supported multiple contracts with competing prototypes in Phase 1 of 2 for Engineering and Manufacturing Development (EMD).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Phase I Engineering and Manufacturing Development (EMD)	26.485	-	-
Description: Develop, demonstrate and qualify the AMP 120mm large caliber munition. ***FY 2016 Accomplishments:*** Preliminary Design Review occurred in 3Q FY 2016. Designed, built and delivered prototype hardware for cartridge demonstration and initiated shoot off testing.			
Accomplishments/Planned Programs Subtotals	26.485	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• AMP (PE / Project: 0604802A / ED7): *120mm Cartridge (Advanced Multipurpose-AMP)*	-	31.215	31.655	-	31.655	28.018	-	-	-	0	90.888
• AMP (SSN: E88105): *120mm Cartridge (Advanced Multipurpose-AMP)*	-	-	-	-	-	25.000	30.000	40.000	48.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** 656 / *120mm Cartridge (Advanced Multipurpose-AMP)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The AMP Program achieved Milestone B and entered EMD in FY 2015. EMD consists of two phases; Phase 1 awarded two contracts in FY 2015 to competitively prototype. A cartridge demonstration test was conducted and was used to support downselect to a single contractor for EMD Phase 2, which will lead to Milestone C in 2019 followed by two Low Rate Initial Productions in FY 2019 and FY 2020 and one optional year of full procurement in FY 2021. Explore options to increase future competition.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) 694 / *Medium Caliber Ammunition*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
694: *Medium Caliber Ammunition*	-	0.000	2.170	1.000	-	1.000	6.200	2.400	0.000	0.000	0.000	11.770
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program 0603639A 694 / Medium Caliber Ammunition funds the 40mm Low Velocity High Explosive Air Burst (HEAB), XM1166 effort in FY 2017 and the ammunition improvements for the Joint Light Tactical Family of Vehicles (FoV) program beginning in FY 2018. The 40mm Low Velocity High Explosive Air Burst (HEAB), XM1166 effort will transition to Program 0604802A EW1 in FY 2018.

A. Mission Description and Budget Item Justification

Joint Light Tactical Family of Vehicles (FoV): Develop and qualify 30x113mm ammunition for the Joint Light Tactical Vehicle (JLTV) which will serve as the Infantry Brigade Combat Team Light Reconnaissance Vehicle (RV). This is an Army directed requirement to enhance the operational effectiveness of the JLTV-RV by increasing precision and lethality capability to defeat personnel and material targets using a 30x113mm weapon system. Qualify the linked M788 and M789 ammunition and develop airburst capable munitions for use with the Light Weight 30mm Link Fed Chain Gun.

High Explosive Air Burst (HEAB) is a new capability identified as a Warfighter requirement in the Capability Development Document (CDD), 40mm Low Velocity (LV) Family of Ammunition Annex. The 40mm LV HEAB tactical cartridge allows the warfighter to effectively engage targets at increased ranges using the 40mm M203/M320 Grenade Launchers. The HEAB cartridge provides the grenadier with a higher probability of achieving a first shot kill against enemy personnel, coupled with the ability to defeat personnel targets in defilade positions at increased ranges with greater accuracy and lethality. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel at increased ranges beyond those offered by the current M433 High Explosive Dual Purpose (HEDP) cartridge. The cartridge provides lethal effects against targets with improved accuracy and greater standoff ranges increasing Soldier Survivability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Test and Evaluation of linked 30x113mm for Suite of Ammunition for Joint Light Tactical FoV ***Description:*** Linked 30x113mm Ammunition Qualification for New Weapon and Vehicle Applications ***FY 2018 Plans:*** FY 2018 funds will be used to update linked 30x113mm ammunition Technical Data Packages (TDPs), purchase ammunition links, and contract to link M788 and M789 cartridges. Linked ammunition deliveries will be synchronized to support ammunition/ link/weapon qualification activities.	-	-	1.000
Title: Pre Engineering Manufacturing Development Activities for the 40mm HEAB XM1166	-	2.170	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** 694 / *Medium Caliber Ammunition*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Description: Pre-award activities need to be accomplished prior to start of EMD. ***FY 2017 Plans:*** FY 2017 supports Milestone B activities and contract preparation.			
Accomplishments/Planned Programs Subtotals	-	2.170	1.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0604802A EW1: *40mm High Explosive Air Burst (HEAB) XM1166*	-	0.353	9.678	-	9.678	13.412	14.195	21.553	1.500	Continuing	Continuing

Remarks

40mm High Explosive Air Burst (HEAB), XM1166, effort transitions to 0604802A EW1 in FY 2018.

D. Acquisition Strategy

Joint Light Tactical FoV: Solicit responses from industry to the government's detailed Technical Data Packages (TDPs) under an existing Indefinite Delivery/Indefinite Quantity (IDIQ) contract. Linked ammunition deliveries to Aberdeen Proving Ground (APG) will be synchronized with test schedules for ammunition/weapon qualification and Remote Weapon Station (RWS)/vehicle integration. Begin preparation activities for ammunition qualification tests and weapon qualification tests in FY 2018. In addition, begin preparation activities for initial effort to develop an airburst capable munition for the JLTV FoV.

The HEAB cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. As part of the pre-EMD activities, Cooperative Research and Development Agreement (CRADA) Testing with contractors will occur to evaluate potential designs. For EMD, two Full and Open competitive contracts will be awarded. After Developmental Test & Evaluation (DT&E) the government will down-select to a single contractor for Low Rate Initial Production (LRIP) and two production year options.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EB8 / *OWL for Small Caliber Ammunition*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EB8: *OWL for Small Caliber Ammunition*	-	2.001	2.166	1.200	-	1.200	2.200	2.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The small caliber One Way Luminescence (OWL) technology applies to multiple calibers. In FY 2018 the 7.62mm OWL program transitions from 0603639A EB8 to 0604802A EP4; the program is not a new start. OWL develops a new tracer technology and applies it to multiple calibers. The initial focus was on 7.62mm ammunition in FY 2015 followed by 5.56mm in FY 2018. As the technology matures the project transitions to Project 0654802A EP4 starting in FY 2018 for 7.62mm, and FY 2021 for 5.56mm. The OWL cartridge will be compatible with all Army Small Caliber weapon systems, but optimized for Machine Guns and will provide improved lethality/target effects over the current tracer munition.

A. Mission Description and Budget Item Justification

The One Way Luminescence (OWL) program is a critical technology development in response to the 7.62mm and 5.56mm Families of Ammunition Capabilities Development Documents (CDD). Current small caliber ammunition tracer rounds are a pyrotechnic tracer mix allowing enemy forces to see the trace round and track its trajectory back to the shooter. The OWL program's objective is to develop and field a full day/night tracer round to replace the current pyrotechnic cartridges with trace cartridges that are only visible to the shooter and soldiers in close proximity, increasing soldier survivability. 7.62mm is the immediate focus followed by 5.56mm OWL cartridges. FY 2018 funding supports finalizing 7.62mm concept development. FY 2018 funding also supports maturing the 5.56mm OWL technology, procuring bullet components, tracer material and testing evaluation in order to attain a Technology Level Readiness (TRL) of 6 in FY 2020; and support of Engineering and Manufacturing Development (EMD) contract development necessary for a FY 2021 Milestone B (MS B).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Technology Maturation and Risk Reduction (TMRR)	2.001	2.166	1.200
Description: One Way Luminescence (OWL) will develop and demonstrate a full day/night tracer technology that eliminates the shortcomings of current legacy tracers.			
FY 2016 Accomplishments: FY 2016 continued with concurrent Government and Contractor efforts to mature technology readiness level in 7.62mm. The efforts included development, procurement, and testing of multiple competing prototype solutions to reduce risk in meeting user requirements. TRL 4 was demonstrated.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EB8 / *OWL for Small Caliber Ammunition*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
FY 2017 efforts will include 7.62mm prototype evaluation in preparation for MS B. EMD contract development will occur in preparation for contact award. TRL 6 will be demonstrated. ***FY 2018 Plans:*** FY 2018 activities include: 7.62mm concept development and maturing the 5.56mm Technology Readiness Level (TRL). The 5.56mm efforts include development, procurement, and testing of multiple competing prototype solutions to reduce risk in meeting user requirements.			
Accomplishments/Planned Programs Subtotals	2.001	2.166	1.200

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0604802A Project EP4: *OWL for Small Caliber Ammunition*	-	-	2.688	-	2.688	5.698	6.002	11.891	6.400	Continuing	Continuing

Remarks

The OWL technology will be integrated into the M80A1 trace ammunition production. The 0604802A EP4, OWL for Small Caliber Ammunition program will not be a new start. FY 2018 funds are realigned from program 0603639A EB8, OWL for Small Caliber Ammunition. The 0604802A EP4 OWL funding line continues the development work of 7.62mm OWL cartridges into Engineering and Manufacturing Development (EMD). EMD work for the 5.56mm cartridges begins in FY 2021.

D. Acquisition Strategy

The OWL concept will be developed through Government and Industry prototyping efforts. A Technology Readiness Assessment (TRA) was conducted in FY 2015 and FY 2016 to measure the progress of the designs. An additional TRA is being conducted in FY 2017. The FY 2017 TRA is conducted to evaluate the industry and Government concepts in order to proceed with Engineering and Manufacturing Development (EMD). The Government plans to demonstrate TRL 6 for 7.62mm in FY 2017 to prepare for Milestone B achievement in FY 2018. The 5.56mm cartridges will follow the 7.62mm schedule with Engineering and Manufacturing Development (EMD) starting in FY 2021. The new tracer cartridges will replace legacy tracers in each of the various small caliber configurations.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EB9 / *Tunable Pyrotechnic Aircraft Countermeasure Flares*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EB9: *Tunable Pyrotechnic Aircraft Countermeasure Flares*	-	1.662	2.368	1.000	-	1.000	1.600	0.000	0.000	2.600	0.000	9.230
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project is to support the advanced development activities and technology demonstrations of the Aviation Airborne Expendable Countermeasure (AAECM). These advanced decoys are necessary to address emerging threats and capabilities deficiencies in Army aircraft protection and the safety of its aircrews against advanced Man-Portable Air Defense Systems (MANPADS) and shoulder launched Surface-to-Air Missiles (SAM) systems. These efforts will evaluate integrated technologies and countermeasure prototype systems in realistic operating test environments. Prototypes will help expedite technology transition from the laboratory to operational use by demonstrating component and subsystem maturity prior to integration into major and complex Army aircraft platforms. These expendable countermeasures systems are an essential part of survivability equipment for Army aircraft. Army RDT&E efforts are coordinated with the PEO Aviation and its platform PMs with PM Aircraft Survivability Equipment (ASE) to address emerging JUONS from theatre. FY2018 Funding is to develop and prepare documentation for Milestone A decision for the Radar Guided decoy. This decoy is designed to defeat specific threat types. Details of their operation is classified. Conduct initial developmental/operational testing on Cloud CM

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Expendable Countermeasures to Guided Missile Threats	1.662	2.368	1.000
Description: This program will develop expendable countermeasure (CM) decoys which will protect Army aircraft from surface-to-air missiles. ***FY 2016 Accomplishments:*** Prepare necessary documents to support Material Development Decision (MDD). ***FY 2017 Plans:*** Develop and prepare documentation for Materiel Development Decision (MDD) approval and prepare documentation to support Milestone Decision (MS A) for the Cloud CM. This decoy is designed to defeat specific threat types. Details of their operation is classified. Conduct initial developmental testing on Cloud CM. ***FY 2018 Plans:*** Develop and prepare documentation for Milestone A decision for the Radar Guided decoy. This decoy is designed to defeat specific threat types. Details of their operation is classified. Conduct initial developmental/operational testing on Cloud CM.			
Accomplishments/Planned Programs Subtotals	1.662	2.368	1.000

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EB9 / *Tunable Pyrotechnic Aircraft Countermeasure Flares*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 0604802A - Weapons and Munitions -: *EP7 - Tunable Pyrotechnic Aircraft Countermeasure Flares*	-	1.450	7.500	-	7.500	7.300	5.800	-	16.400	0.000	38.450

Remarks

D. Acquisition Strategy

The Acquisition strategy is for a family of countermeasure flares that will be developed in incremental phases as funding and requirements are approved. Initial countermeasure flare is the Cloud CM followed by new increments that will defeat threats outlined in the requirements documents developed by TRADOC. MDD approval is in 3QFY17

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EC2 / *Adv Armor-Piercing (ADVAP) for Small Cal Ammo*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EC2: *Adv Armor-Piercing (ADVAP) for Small Cal Ammo*	-	7.395	0.000	0.000	-	0.000	3.800	6.900	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The small caliber Advanced Armor-Piercing (ADVAP) technology applies to multiple calibers. In FY 2017, the 7.62mm ADVAP transitions to PE 0604802A.

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 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 cartridge will be optimized for use in the M240 Machine Gun.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Technology Maturation & Risk Reduction (TMRR)	7.395	-	-
Description: Develop, demonstrate, and qualify XM1158 Small Caliber Ammo 7.62mm ADVAP cartridges in order to defeat threat targets and provide overmatch capability versus a broad spectrum of hard targets. ***FY 2016 Accomplishments:*** FY 2016 work included optimization of the 7.62mm XM1158 cartridge design through advanced modeling, simulation, and test iterations, along with alternate material studies, manufacturing studies and propellant requirement investigation. Demonstrated Technology Readiness Level (TRL) 6. Funding also supported preparation for MS-B.			
Accomplishments/Planned Programs Subtotals	7.395	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0604802A Project EP5: *Advanced Armor-Piercing (ADVAP) for Small Cal Ammunition*	-	10.270	11.571	-	11.571	12.887	1.804	7.297	7.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EC2 / *Adv Armor-Piercing (ADVAP) for Small Cal Ammo*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost

Remarks

This funding line continues the development work of both 7.62mm and 5.56mm ADVAP cartridges into Engineering & Manufacturing Development (EMD).

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, accomplished design optimization, manufactured prototypes, and demonstrated TRL 6 for XM1158. Milestone B (MS-B) occurred in 1st Quarter FY 2017 leading to fabrication and testing of qualification hardware. The 5.56mm cartridge, starting in FY 2019, will follow a similar strategy as the 7.62mm.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EC3 / *Ammunition Logistics Prototyping*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EC3: *Ammunition Logistics Prototyping*	-	3.430	2.017	1.677	-	1.677	2.209	2.151	2.054	3.754	0.000	17.292
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. FY2018 funding used to complete system component integration and conduct verification testing and an operational demonstration for the environmental health monitoring system. Complete prototype development and verification testing of a next generation temperature/ humidity sensor with batch interrogation and historical data retention capabilities, which will be used for assessing munitions reliability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Munitions Health and Inventory Monitoring Systems	1.390	0.722	1.177
Description: Performance and reliability of certain munitions can be degraded by the environmental exposure history they have experienced in their lifetime. This program will develop simple to complex environmental health and inventory monitoring systems to improve reliability and asset visibility and enable effective Condition Based Management for Ammunition.			
FY 2016 Accomplishments: Conducted operational testing and modified design of a passive time/temperature exposure sensor that aids in assessing munitions reliability. Completed requirements evaluation for an ammunition packaging mounted environmental health monitoring system that will facilitate improved ammunition management.			
FY 2017 Plans: Fabricate environmental health monitoring system prototypes and conduct engineering testing. Conduct correlation testing on the passive time/temperature exposure sensor with additional ammunition items.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EC3 / *Ammunition Logistics Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Complete system component integration and conduct verification testing and an operational demonstration for the environmental health monitoring system. Complete prototype development and verification testing of a next generation temperature/humidity sensor with batch interrogation and historical data retention capabilities, which will be used for assessing munitions reliability.			
Title: Munitions Containerization Systems ***Description:*** For each family of munitions containers, optimize prototype container systems for automation compatibility, combat unit load quantity, sustainability/recyclability, Insensitive Munitions/explosives safety, environmental protection, load reconfiguration, unitization, and standardized interfaces. This will improve ammunition distribution efficiency while minimizing environmental and operational impacts. ***FY 2016 Accomplishments:*** blank ***FY 2017 Plans:*** Complete fabrication and prototype verification testing of the lightweight plastic polymer cylindrical ammunition container. ***FY 2018 Plans:*** Mature design and fabricate prototype plastic polymer rectangular containers for developmental 5.56mm ammunition.	0.518	0.812	0.500
Title: Insensitive Munitions (IM) Integration ***Description:*** Optimize multiple IM technologies to improve munitions survivability and warfighter safety. Advanced IM Technologies will be developed in the areas of warhead, propulsion and propellants, explosives, packaging, and barriers. Efforts will increase the number of IM compliant ammunition items fielded in order to mitigate munitions reaction to unplanned stimuli such as fire, fragments, enclosed heat build-up (cook-off), bullets, adjacent munitions reaction (sympathetic detonation), and shape charge jet attacks. ***FY 2016 Accomplishments:*** Developed Insensitive Munitions (IM) high output booster explosives to replace booster materials in fuzes, supplemental and auxiliary charges, and main fills for medium caliber munitions. Developed less sensitive IM propellants for mortar and tank munitions. Implemented warhead venting technology for the 120mm high energy warhead. ***FY 2017 Plans:*** Demonstrate booster energetics in medium caliber munitions and boosters. Implement container seam venting technologies into 120mm mortar packaging containers. Test new packaging and internal dunnage materials to actively attract or pull heat away from vulnerable munition components in case of fire.	1.522	0.483	-
Accomplishments/Planned Programs Subtotals	3.430	2.017	1.677

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EC3 / *Ammunition Logistics Prototyping*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EL7 / *Reduced Range Ammunition*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EL7: *Reduced Range Ammunition*	-	0.000	2.166	7.600	-	7.600	7.700	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The small caliber Reduced Range Ammunition (RRA) technology applies to multiple calibers. As the technology matures the program will transition to Project 0604802A EP3 in FY 2019 for 7.62mm and FY 2020 for .50 caliber ammunition.

A. Mission Description and Budget Item Justification

The small caliber Reduced Range Ammunition (RRA) program is a critical technology development in response to the 7.62mm and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. FY 2018 dollars support Technology Maturation and Risk Reduction in preparation for a 7.62mm TRL 6 demonstration and preparation for Milestone B (MS-B). Leverage lessons learned from Marine Corp .50 Caliber Reduced Range Ammunition effort. Purchase test articles and perform engineering tests to qualify the .50 Caliber Marine Corps design/ammunition for Army use.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Technology Maturation and Risk Reduction (TMRR)	-	2.166	7.600
Description: Develop, demonstrate, and qualify a small caliber Reduced Range Ammunition (RRA) 7.62mm and .50 caliber ammunition capability that will provide a reduced range training capability to the M240 and M2 gunner. ***FY 2017 Plans:*** Mature development and demonstrate (TRL6) 7.62mm Ball and Trace RRA cartridges. Conduct Materiel Development Decision (MDD) and MS-B preparations. ***FY 2018 Plans:*** Conduct System Requirements Review (SRR) and perform MS-B preparation activities for 7.62mm. Mature development and demonstrate (TRL6) .50 Cal Ball and Trace RRA cartridges and conduct Materiel Development Decision (MDD), System Requirements Review (SRR), and MS-B preparation. Purchase test articles to begin efforts to qualify the .50 Caliber Marine Corps design/ammunition for Army use.			
Accomplishments/Planned Programs Subtotals	-	2.166	7.600

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EL7 / *Reduced Range Ammunition*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0604802A Project EP3: *Reduced Range Ammunition - Small Caliber*	-	-	-	-	-	2.500	10.000	15.500	10.000	Continuing	Continuing

Remarks

The 0604802A EP3, Reduced Range Ammunition - Small Caliber, program will not be a new start. Funds in this program in FY 2019 are a realignment of funds from program 0603639A EL7, RRA. The 0604802A EP3, RRA funding line continues the development work of 7.62mm and supports Engineering and Manufacturing Development (EMD) in FY 2019.

D. Acquisition Strategy

The Government will award a competitive contract for 7.62mm Pre-Production Qualification Testing (PPQT) hardware in FY 2020. After 7.62mm MS-B in FY 2019, the Government intends to award an EMD contract. The .50 Caliber program will follow a similar strategy starting in FY 2018. After .50 Caliber RRA MS-B in FY 2020, the Government intends to award a competitive EMD contract.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EL8 / *LIGHTWEIGHT CARTRIDGE CASE FOR SMALL CALIBER*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EL8: *LIGHTWEIGHT CARTRIDGE CASE FOR SMALL CALIBER*	-	1.299	1.280	2.500	-	2.500	0.000	0.000	0.000	0.000	0.000	5.079
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The Lightweight Cartridge Case small caliber technology will be applied to multiple calibers. The project involves developing and qualifying lightweight cartridge case, starting with 7.62mm ammunition, 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 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. FY 2018 funding will support the development of the preliminary lightweight cartridge design to include a Systems Requirement Review, Preliminary Design Review, and manufacturing of Pre-Validation Test Samples.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: 7.62mm Technology Maturation & Risk Reduction (TMRR) for Lightweight Small Caliber Ammunition (LSCA)	1.299	1.280	2.500
Description: Develop, demonstrate, and qualify a Lightweight Small Caliber Ammunition (LSCA) 7.62mm capability that will provide ten to fifty percent ammunition weight savings.			
FY 2016 Accomplishments: Awarded development contracts, received hardware and conducted the M80 polymeric cartridge testing. Hosted an Industry Day for the LSCA Program. Initiated Phase I Industrial Impacts Study with existing Small Caliber Producers to assess the facilitization impacts, manufacturing process, and production risks of transitioning to a lightweight cartridge.			
FY 2017 Plans: Complete Phase II DoD Ordnance Technology Consortium (DOTC) efforts and demonstrate TRL 6 for M80A1 and M62A1 LSCA cartridge deliverables will undergo TRL 6 evaluation. Finalize documentation required for a Full and Open competition by including the information obtained from the Phase II DOTC efforts. Conduct a technology readiness assessment and develop the request for proposal.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EL8 / *LIGHTWEIGHT CARTRIDGE CASE FOR SMALL CALIBER*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Phase II Contractor will develop a preliminary lightweight cartridge design. The Government will complete Systems Requirement Review and Preliminary Design Review then begin Pre-Validation Testing and Limited User Evaluation.			
Accomplishments/Planned Programs Subtotals	1.299	1.280	2.500

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• PE 0654802A Project EP6: *Lightweight Cartridge Case for Small Caliber Ammunition*	-	1.290	-	-	-	-	-	-	2.000	0.000	3.290
• PE 0607131A Project ER6: *Direct Fire Technology*	-	-	0.855	-	0.855	4.300	0.500	-	-	Continuing	Continuing

Remarks

The funding lines continue work on the 7.62mm ammunition which will transition to PE 0607131A ER6, Direct Fire Technology. The follow-on effort for the .50 Cal will start in FY 2022.

D. Acquisition Strategy

Multiphase development contracts. Phase I and Phase II include development and evaluation of multiple designs/concepts. The Government intends to down-select to one design for Phase III in FY 2019 to manufacture test hardware to support Validation Testing planned for FY 2020. Low Rate Initial Production award will occur in FY 2021.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EU1 / *Enhanced Lethality Cannon Munitions*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EU1: *Enhanced Lethality Cannon Munitions*	-	0.000	9.866	10.000	-	10.000	0.000	0.000	0.000	0.000	0.000	19.866
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Enhanced Lethality Cannon Munitions (ELCM) project will evaluate, develop, mature, and demonstrate new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to Engineering Manufacturing Development (EMD). The ELCM project will prototype and accelerate the maturation of enhanced lethality technologies, such as Lithographic Fragmentation Technology (LFT), for 155mm cannon artillery munition. The ELCM project will accelerate the development and maturation of LFT for subsequent integration on the 155mm XM1128 high explosive projectile per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition, 22 December 2016. ELCM addresses requirements for increased lethality above the current U.S. Army go-to-war 155mm high explosive unitary projectiles, the M795 Insensitive Munition.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Enhanced Lethality Cannon Munitions	-	9.866	10.000
Description: Evaluate, Develop, Prototype and Demonstrate Enhanced Lethality technologies. ***FY 2017 Plans:*** Accelerate development and maturation of enhanced lethality technologies, such as LFT, to transition from subsequent integration on the XM1128 to Engineering & Manufacturing Development (EMD) in FY 2018. ***FY 2018 Plans:*** Conduct prototyping of enhanced lethality technologies applicable to 155mm cannon artillery munitions.			
Accomplishments/Planned Programs Subtotals	-	9.866	10.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• BA5 PE 0604802A Project EU7: *Enhanced Lethality Cannon Munitions*	-	8.000	20.500	-	20.500	8.000	8.000	8.000	-	0.000	52.500

Remarks

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EU1 / *Enhanced Lethality Cannon Munitions*

D. Acquisition Strategy

As a pre-Milestone B advanced component development and competitive prototyping project, this effort will identify, develop, prototype, evaluate, analyze, and demonstrate potential enhanced lethality alternative solutions for Government and/or Industry. This effort will quantify the respective maturity and effectiveness to mitigate capability gaps against representative enemy target sets and operational scenarios. Enhanced lethality technologies will be evaluated for merit and transition onto new cannon artillery munitions programs of record as appropriate. Following Milestone B, new cannon munitions programs will enter EMD.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EU1 / *Enhanced Lethality Cannon Munitions*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XM1128 Prototyping	MIPR	Various : Various	0.000	-		4.996		-		-		-	Continuing	Continuing	Continuing
ELCM Prototyping	MIPR	Various : Various	0.000	-		-		6.450		-		6.450	Continuing	Continuing	Continuing
		Subtotal	0.000	-		4.996		6.450		-		6.450	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	MIPR	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.000	-		1.086		0.650		-		0.650	Continuing	Continuing	Continuing
Engineering Support	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		2.040		1.000		-		1.000	Continuing	Continuing	Continuing
		Subtotal	0.000	-		3.126		1.650		-		1.650	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Performance-related Lethality Developmental Testing	MIPR	Naval Surface Warfare Center (NSWC) - Dahlgren : Dahlgren, VA	0.000	-		1.086		1.400		-		1.400	Continuing	Continuing	Continuing
Lethality Simulations and Evaluation	MIPR	Army Materiel Systems Analysis Activity (AMSA) : Aberdeen, MD	0.000	-		0.658		0.500		-		0.500	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EU1 / *Enhanced Lethality Cannon Munitions*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.000	-		1.744		1.900		-		1.900	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		9.866		10.000		-		10.000	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EU1 / *Enhanced Lethality Cannon Munitions*

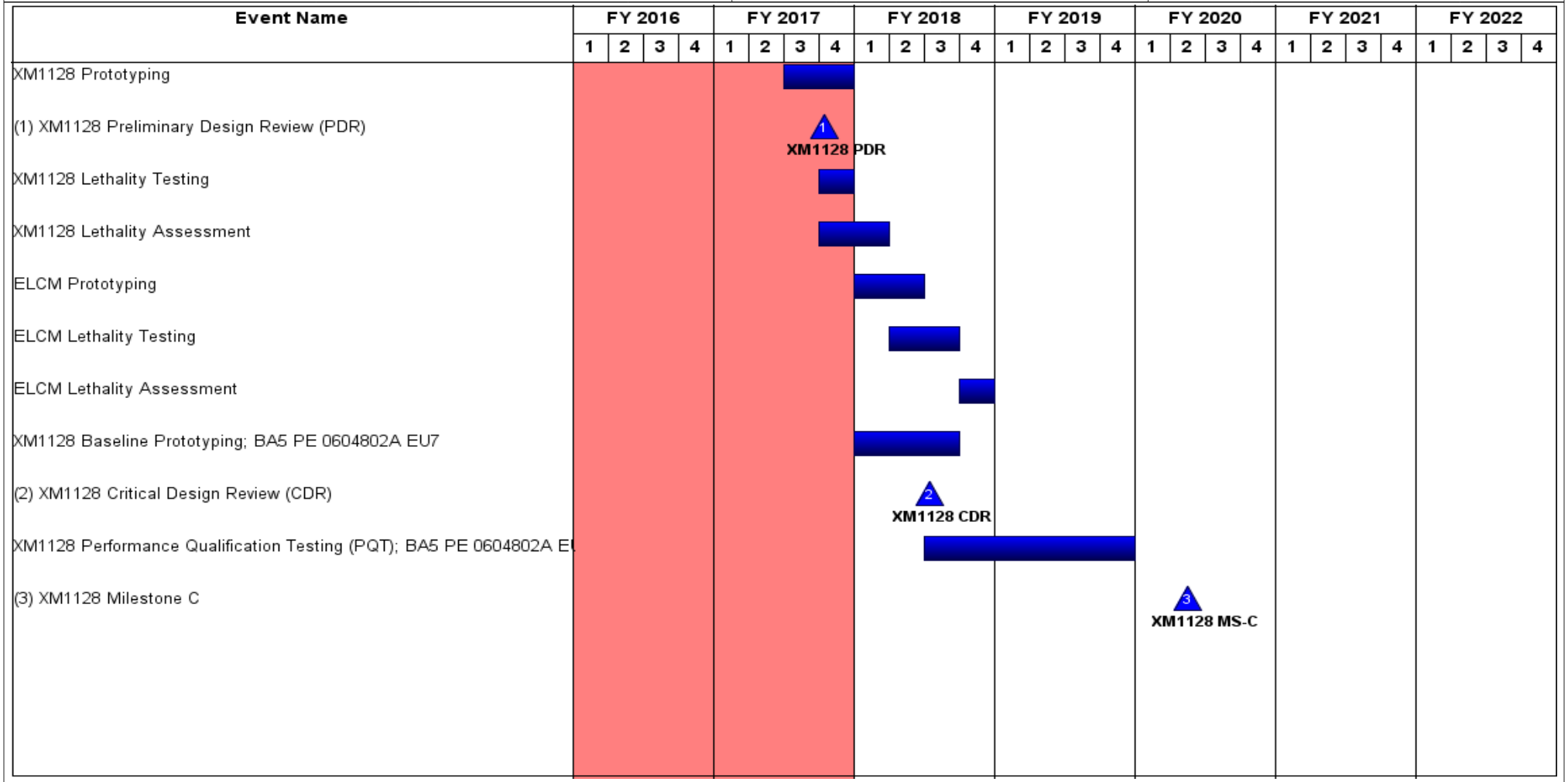

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EU1 / *Enhanced Lethality Cannon Munitions*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
XM1128 Prototyping	3	2017	4	2017
XM1128 Preliminary Design Review (PDR)	4	2017	4	2017
XM1128 Lethality Testing	4	2017	4	2017
XM1128 Lethality Assessment	4	2017	1	2018
ELCM Prototyping	1	2018	2	2018
ELCM Lethality Testing	2	2018	3	2018
ELCM Lethality Assessment	4	2018	4	2018
XM1128 Baseline Prototyping; BA5 PE 0604802A EU7	1	2018	3	2018
XM1128 Critical Design Review (CDR)	3	2018	3	2018
XM1128 Performance Qualification Testing (PQT); BA5 PE 0604802A EU7	3	2018	4	2019
XM1128 Milestone C	2	2020	2	2020

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) EU2 / *Improved Multi-Option Fuze (iMOFA/ iMOFM)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EU2: *Improved Multi-Option Fuze (iMOFA/iMOFM)*	-	0.000	7.892	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.892
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Improved Multi-Option Fuze (iMOFA/iMOFM) project will identify, develop, prototype, and demonstrate new improved multi-option fuze technologies, components, and subsystems based on Government-owned Next Generation Proximity Sensor (NGPS) capabilities with built-in exportability attributes previously matured via OSD-sponsored techbase efforts under the Joint Fuze Technology Program and Defense Exportability Features (DEF) Congressional Pilot Program. This project will support technology maturation and risk reduction, and will evaluate and analyze producibility, affordability, safety, and compatibility of these prototype potential materiel solutions in representative realistic performance-related developmental tests. Up to four potential NGPS with built-in DEF technology prototype solutions for improved multi-option fuzing systems from Government and/or Industry will be prototyped and evaluated. This project will enable fact-based analysis of new Government-owned height of burst/proximity fuzing alternatives that are resistant to enemy countermeasures and reverse engineering threats, quantify their effectiveness, reduce integration risk, and support transition into existing/new artillery/mortar fuzes and munitions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Improved Multi-Option Fuze	-	7.892	-
Description: Identify, develop, prototype, and assess improved multi-option fuze technologies. ***FY 2017 Plans:*** Identify, develop, and prototype potential improved multi-option fuze technologies, components, and subsystems using NGPS with built-in DEF. Conduct performance-related developmental tests for up to four potential prototype alternatives to quantify effectiveness, reduce risk, and support transition into improved Multi-Option Fuze Artillery (iMOFA) and improved Multi-Option Fuze Mortar (iMOFM) applications.			
Accomplishments/Planned Programs Subtotals	-	7.892	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• BA5 PE 0604802A Project EU8: *Improved Multi-Option Fuze*	-	-	8.000	-	8.000	8.000	10.000	-	-	0.000	26.000

Remarks

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** EU2 / *Improved Multi-Option Fuze (iMOFA/ iMOFM)*

D. Acquisition Strategy

As an advanced component development and competitive prototyping project, this effort will identify, develop, prototype, evaluate, analyze, and demonstrate up to four potential improved Multi-Option Fuze solutions from Government and/or Industry. This effort will quantify their respective maturity and effectiveness in providing conventional Cannon Artillery and Mortar munitions a height of burst/proximity fuzing capability that is resistant to enemy countermeasures and reverse engineering threats. Appropriate mature potential solutions will be selected for subsequent transition and technical implementation as an inherent part of improved Multi-Option Fuze programs of record via subsequent Engineering and Manufacturing Development program for Type Classification into existing multi-option fuzes for Cannon Artillery and Mortar Munitions with supporting detailed government-owned Technical Data Packages (TDPs) to enable “build to print” by Industry.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) FA5 / *Assured Precision Weapons and Munitions*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FA5: *Assured Precision Weapons and Munitions*	-	0.000	10.171	13.000	-	13.000	15.000	12.000	8.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Assured Precision Weapons and Munitions project is a continuation of FY14-16 efforts initiated under 644120A-ED5. The objective of this advanced component development and prototyping effort is to identify, evaluate, mature, test, and demonstrate various assured precision prototype technologies in weapons and munitions systems to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent Program of Record (PoR) integration risk. Assured Precision Weapons and Munitions are an integral part of US military strategy and continue to enable combat overmatch and dominance across the Land Component battlespace. Unhindered access to trusted Positioning, Navigation, and Timing (PNT) information under conditions where existing space based PNT (i.e. P(Y)-Code Global Positioning System (GPS)) may be limited or denied has created the need to develop, prototype, and evaluate new/emerging Assured PNT capabilities (including M-Code GPS and Pseudolites) into both PGMs and Weapons operating in a complex system-of-systems environment. This imperative is reinforced by Public Law 111-383 Section 913 which mandates the use of Air Force-developed M-Code GPS capabilities in all systems fielded FY2018 and beyond unless a waiver is obtained from the Secretary of Defense. As such, both precision weapon and munition PoRs must coordinate with the development and technology delivery activities of the Air Force's Military GPS User Equipment (MGUE) program and the Army's Assured PNT program to protect and insure critical precision-based Joint warfighting capabilities as well as maximizing effectiveness and efficiency of US taxpayer investments across multiple Lethality portfolios.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Assured Precision Weapons and Munitions Integrated Product Support	-	1.614	2.971
Description: Provide assured precision weapons and munitions technical subject matter expertise. ***FY 2017 Plans:*** The subject matter experts will coordinate with and support the development and technology delivery activities of the Air Force's Military GPS User Equipment (MGUE) program and the Army's Assured PNT program including participation in design reviews, evaluation and formal feedback on systems requirements and technology performance, component and subsystem architecture input essential for precision weapons and munitions operating in a system-of-systems environment, and configuration management of the evolving Joint Common GPS Specification and Interface Control Document for Precision Guided Munitions. ***FY 2018 Plans:*** The subject matter experts will continue coordinating with and supporting the development and technology delivery activities of the Air Force's MGUE program and the Army's Assured PNT program including participation in design reviews, evaluation and formal feedback on systems requirements and technology performance, component and subsystem architecture input essential for precision weapons and munitions operating in a system-of-systems environment, and configuration management of the			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** FA5 / *Assured Precision Weapons and Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
evolving Joint Common GPS Specification and Interface Control Document for Precision Guided Munitions. Specific support focus includes requirements for MGUE Increment 2 and Pseudolite related technology maturity for Assured PNT Milestone decisions.			
Title: PGM MGUE Anti-Spoof Risk Reduction Effort ***Description:*** Implementing Anti-Spoof (AS) capabilities on MGUE PGM receivers is a major risk to PGMs (including Precision Guidance Kit (PGK)). This effort will identify, evaluate, and quantify the predicted performance of AS capabilities against various MGUE PNT threat scenarios and their corresponding impacts on Time To Assured Navigation (TTAN) for PGMs and resulting operational performance impacts to reduce risk to multiple adopting PGM Programs of Record (PoRs). ***FY 2017 Plans:*** Identify corresponding risks and modify associated component/sub-system requirements that reflect demanding gun-hardened, hot-start, high-spin post-launch munition environments and assess potential AS capabilities to accelerate the subsequent adoption and integration of MGUE technology into PGK. Identify risks and develop prototypes that support subsequent development of a M-Code capable setter system that is backward compatible with legacy systems.	-	8.557	-
Title: Assured PNT related Integration Risk Mitigation ***Description:*** Identify, evaluate, mature, test, and demonstrate various assured precision prototype technologies in weapons and munitions systems to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent Program of Record (PoR) integration risk. ***FY 2018 Plans:*** Initiate analysis and evaluation of various assured precision prototype technologies in weapons and munitions systems to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent Program of Record (PoR) integration risk, including specific focus on Pseudolite related weapons and munitions integration risk mitigation and Emplaced Weapon Use-Case needed for Precision Fires.	-	-	5.967
Title: Assured PNT related Weapons and Munitions Prototyping ***Description:*** Develop, prototype, and evaluate new/emerging Assured PNT capabilities (including M-Code GPS and Pseudolites) into both Weapons and Munitions (including Cannon, Mortar, and Close Combat systems) operating in a complex heterogeneous system-of-systems environment. ***FY 2018 Plans:***	-	-	4.062

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** FA5 / *Assured Precision Weapons and Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Initiate development, prototyping, and evaluation of new/emerging Assured PNT capabilities (including M-Code GPS and Pseudolites) for PGK, M777A2, and M119A3 when operating in a complex heterogeneous system-of-systems environment. Continue prototyping/evaluation in support of a subsequent M-Code/Pseudolite capable setter.			
Accomplishments/Planned Programs Subtotals	-	10.171	13.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Planned Acquisition Strategy for the Assured Precision Weapons and Munitions program is to utilize the Defense Ordinance Technology Consortium (DOTC) Section 845 Other Transaction Authority (OTA) contract mechanism to obtain prototypes to demonstrate and evaluate the maturity of the M-Code GPS on Precision Cannon Munitions as well as other Assured PNT related capabilities.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** FA5 / *Assured Precision Weapons and Munitions*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PGM MGUE AS Risk Reduction	MIPR	DoD Ordnance Technology Consortium (DOTC) - TBD : Various	0.000	-		8.177	Dec 2016	-		-		-	0.000	8.177	4.000
Assured PNT related Integration Risk Mitigation and Prototyping	MIPR	DoD Ordnance Technology Consortium (DOTC) - TBD : Various	0.000	-		-		9.765	Dec 2017	-		9.765	25.127	34.892	34.701
		Subtotal	0.000	-		8.177		9.765		-		9.765	25.127	43.069	38.701

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.000	-		0.508	Jan 2016	0.625	Jan 2018	-		0.625	1.725	2.858	2.858
Assured Precision Weapons and Munitions IPT Support	MIPR	Various : Various	0.000	-		1.106	Dec 2016	2.155	Jan 2017	-		2.155	6.465	9.726	9.726
Assured Technologies Engineering Support	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		0.380	Dec 2016	0.455	Jan 2017	-		0.455	1.156	1.991	1.991
		Subtotal	0.000	-		1.994		3.235		-		3.235	9.346	14.575	14.575

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		10.171		13.000		-		13.000	34.473	57.644	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) FA5 / *Assured Precision Weapons and Munitions*	

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** FA5 / *Assured Precision Weapons and Munitions*

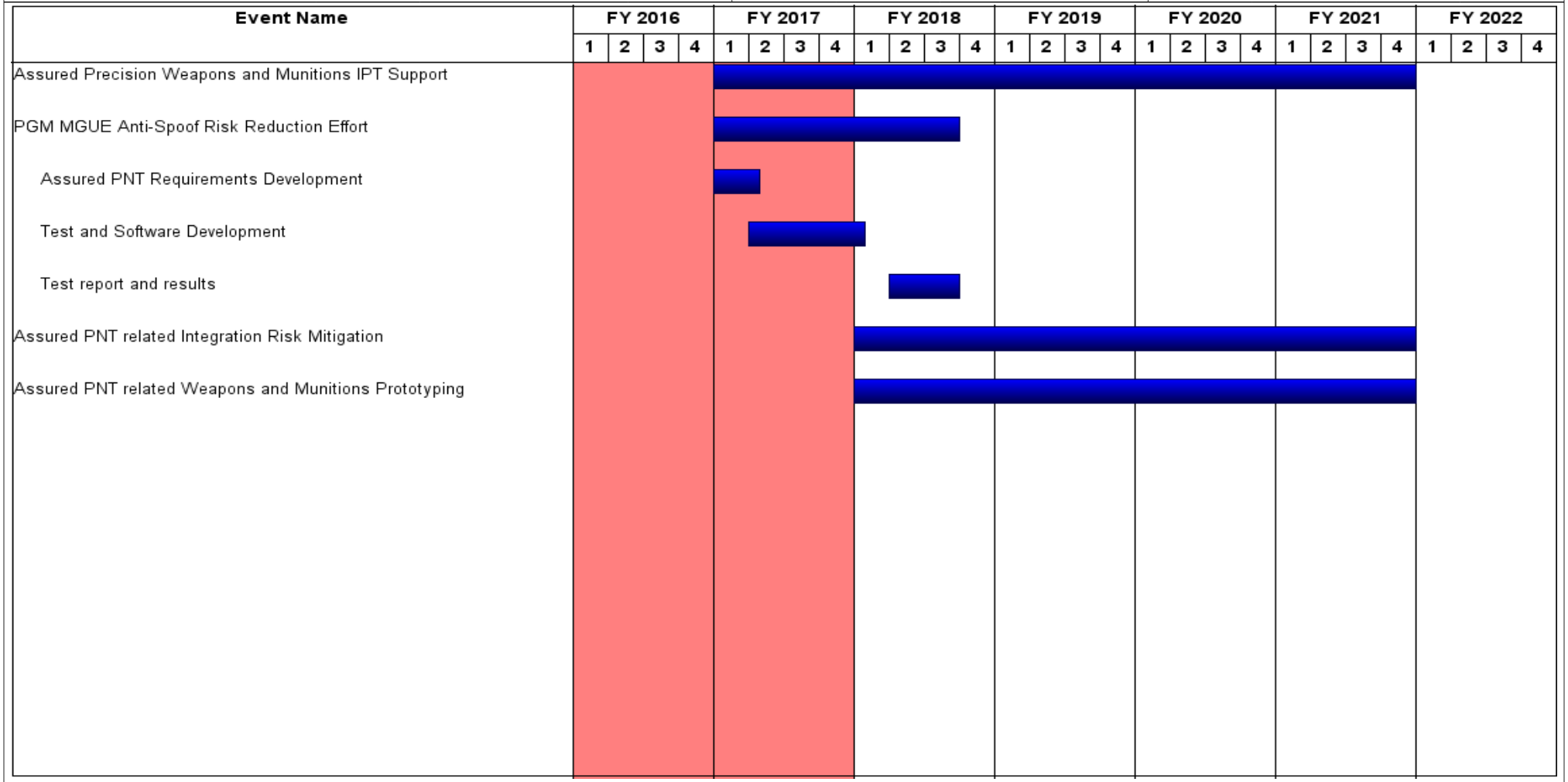

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** FA5 / *Assured Precision Weapons and Munitions*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Assured Precision Weapons and Munitions IPT Support	1	2017	4	2021
PGM MGUE Anti-Spoof Risk Reduction Effort	1	2017	3	2018
Assured PNT Requirements Development	1	2017	2	2017
Test and Software Development	2	2017	1	2018
Test report and results	2	2018	3	2018
Assured PNT related Integration Risk Mitigation	1	2018	4	2021
Assured PNT related Weapons and Munitions Prototyping	1	2018	4	2021

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) FG1 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
FG1: *Cannon-Delivered Area Effects Munitions (C-DAEM)*	-	0.000	2.000	1.000	-	1.000	0.000	0.000	0.000	0.000	0.000	3.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cannon-Delivered Area Effects Munitions (C-DAEM) project will analyze, identify, develop, prototype, and demonstrate 155mm Cannon Artillery munition area effects capability. C-DAEM are envisioned as a suite of 155mm artillery munitions, to provide U.S. ground forces with a capability to effectively engage area targets to destroy, neutralize, and/or suppress threat platforms and facilities, and deny threat forces full operational freedom within the targeted area. Initial objective values for C-DAEM would meet Dual Purpose Improved Conventional Munitions (DPICM) effects capabilities against personnel and light vehicles and exceed DPICM effects capabilities against armor. An Analysis of Alternatives (AoA) will be completed to best inform necessary area effect lethality requirements. The program addresses requirements from the U.S. Army adopted U.S. Marine Corps (USMC) C-DAEM Initial Capabilities Document (ICD) [AROC adopted 20 October 2016, JROC approved 11 May 2016]. The approved C-DAEM ICD as an Army requirement is located in the Capabilities and Army Requirements Documents number 0438. The Joint Staffing Designator is Joint Requirement Oversight Council (JROC) Interest.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: C-DAEM AoA	-	2.000	1.000
Description: The C-DAEM AoA will assess a range of alternatives for replacing the DPICM for current 155mm cannon systems. The goal is to inform the Milestone Decision Authority (MDA) of cost-effective and affordable alternatives that provide performance similar to or better than DPICM. ***FY 2017 Plans:*** Initiate and conduct C-DAEM AoA. ***FY 2018 Plans:*** Complete C-DAEM AoA to inform C-DAEM required capabilities. Conduct Milestone A review with MDA.			
Accomplishments/Planned Programs Subtotals	-	2.000	1.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** FG1 / *Cannon-Delivered Area Effects Munitions (C-DAEM)*

D. Acquisition Strategy

As a Pre-Milestone A project in the Milestone Solution Analysis (MSA) phase, this effort will inform desired C-DAEM capabilities. Milestone A currently planned for 4Q FY 2018.

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603639A / *Tank and Medium Caliber Ammunition*	Project (Number/Name) XT5 / *30mm Anti-Personnel and Counter UAS*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
XT5: *30mm Anti-Personnel and Counter UAS*	-	0.000	0.000	2.475	-	2.475	3.500	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2018, PE 0603639A Project XT5 is a new start program.

Lightweight 30mm x 113mm (LW30) Airburst ammunition is a new capability identified as a Warfighter requirement. The LW30 airburst cartridge improves the warfighter's probability in defeating anti-personnel and anti-materiel targets due to increased lethality. Airburst capability allows a much higher probability of achieving a first burst kill against enemy personnel targets in the open. The LW30 will retain its dual purpose warhead, allowing it to continue to defeat light armored threats through point detonation. The cartridge provides increased lethal effects against personnel & soft-skin vehicular targets increasing Soldier Survivability while troops are in contact engagements and decreases the required number of rounds to reach the desired lethal effects. FY 2018 supports Technology Maturation and Risk Reduction effort.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Pre Engineering Manufacturing Development Activities	-	-	2.475
Description: Pre-Milestone B approval. Technology Readiness Level 6 must be demonstrated. ***FY 2018 Plans:*** FY 2018 Technology Maturation and Risk Reduction will be performed by the Government. Initial ammunition design concepts will be developed along with integration studies into the weapons systems.			
Accomplishments/Planned Programs Subtotals	-	-	2.475

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The LW30 Airburst cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. As part of the pre-EMD activities, an Other Technology Agreement (OTA) contract will be award to develop competitive prototypes to demonstrate technology maturation level 6. For the first phase of EMD, two Full and Open competitive contracts will be awarded. Prior to Development Test & Evaluation (DT&E), the Government will down-select to a single contractor for EMD completion followed by a contract for Low Rate Initial Production (LRIP) and two production options.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603639A / *Tank and Medium Caliber Ammunition*	**Project (Number/Name)** XT5 / *30mm Anti-Personnel and Counter UAS*

E. Performance Metrics

N/A