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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army										Date: May 2017			
Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev								
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	-	18.037	99.165	145.232	-	145.232	147.492	105.404	85.760	65.505	Continuing	Continuing	
613: MORTAR SYSTEMS	-	0.000	25.148	20.115	-	20.115	32.927	25.566	10.478	8.300	Continuing	Continuing	
EC1: 40mm Hi Vel and Low Vel Thermal Training Cartridge	-	6.969	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.969	
EC4: Non-Standard Simulator Munitions	-	1.915	1.092	2.839	-	2.839	3.184	2.675	2.146	2.185	0.000	16.036	
ED7: Advanced Multipurpose (AMP) Cartridge	-	0.000	31.215	31.655	-	31.655	28.018	0.000	0.000	0.000	0.000	90.888	
EL9: Ammunitions Logistics Prototyping	-	0.000	0.106	0.686	-	0.686	0.798	0.986	1.041	3.755	0.000	7.372	
EP2: Individual Assault Munition (IAM)	-	0.000	4.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.000	
EP4: One-Way Luminescence for Small Caliber Ammo	-	0.000	0.000	2.688	-	2.688	5.698	6.002	11.891	6.400	Continuing	Continuing	
EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo	-	0.000	10.270	11.571	-	11.571	12.887	1.804	7.297	7.000	Continuing	Continuing	
EP6: Lightweight Cartridge Case for Small Caliber Ammo	-	0.000	1.290	0.000	-	0.000	0.000	0.000	0.000	2.000	0.000	3.290	
EP7: Aviation Airborne Expandable Countermeasures	-	0.000	1.431	7.500	-	7.500	7.300	5.800	0.000	16.400	0.000	38.431	
EU4: 40mm HV Improved High Explosive Dual Purpose	-	0.000	0.303	3.191	-	3.191	7.288	13.207	2.970	2.341	0.000	29.300	
EU7: Enhanced Lethality Cannon Munitions	-	0.000	8.000	20.500	-	20.500	8.000	8.000	8.000	0.000	0.000	52.500	
EU8: Improved Multi-Option Fuze	-	0.000	0.000	8.000	-	8.000	8.000	10.000	0.000	0.000	0.000	26.000	
EW1: 40mm LV High Explosive Air Burst, XM1166	-	0.000	0.353	9.678	-	9.678	13.412	14.195	21.553	1.500	0.000	60.691	

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FA6: 30mm Lethality	-	0.000	0.000	12.000	-	12.000	14.000	9.000	12.000	7.000	0.000	54.000	
S36: Precision Guidance Kit	-	9.153	15.957	14.809	-	14.809	5.980	8.169	8.384	8.624	Continuing	Continuing	

Note

In FY 2018, PE 0604802A Project EW1 40mm Low Velocity Door Breach (DB), XM1167, is a new start program. However, project EW1 40mm Low Velocity High Explosive Air Burst (HEAB) XM1166 is not a new start program.
In FY 2018, PE 0604802A Project FA6 is a new start program.

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) project 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. 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. FY 2018 funding will support the continuation of the Engineering and Manufacturing Development (EMD) phase; activities will include Preliminary Design Review (PDR), award of follow on developmental efforts, and initiation of detailed design phase.

The Weaponized Universal Lightweight Fire-control (WULF) project 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 improve the accuracy of the M252 mortar. FY 2018 funding will support the continuation of the EMD phase; activities will include Critical Design Review (CDR), engineering development, and software refinement of matured prototype to support the off Line-Replacement-Unit Environmental test and Software Development Engineering testing.

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 M781 LV Target Practice and the 40mm M918/M385A1 (Mixed Belt) HV Target Practice. 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 pyrotechnics 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

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<p>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 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, mitigate environmental concerns and 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 M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. FY 2018 will support continuation of the Engineering and Manufacturing Development (EMD) Phase 2 which will include safety and performance testing and the manufacturing and procurement of cartridges for the third Cartridge Integration Test. FY 2018 will also support the Critical Design Review (CDR) and initiation of the Developmental Test and Evaluation (DT&E) cartridge build. Evaluate the scalability for future combat platforms.</p> <p>Project EL9: 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 will support the integration of the munitions health monitoring system with developmental ammunition items and be used to conduct qualification tests and integrate passive time/temperature exposure sensor with developmental ammunition items and conduct qualification testing.</p> <p>Project EP2: The interim solution to the Individual Assault Munition (IAM) will be a lightweight shoulder launched munition (SLM) capability for combat units at the individual Soldier level. As an improvement over existing SLM, the interim solution will allow Soldiers to conduct Urban Operations with an ability to defeat the enemy protected by a variety of field expedient, structural and lightly armored vehicles. This interim solution will be effective day or night at close ranges with an ability to safely engage targets from within enclosures using single hearing protection. This interim solution will combine the capability of multiple existing SLM which will allow for reduced Soldier load, training complexity and logistics burden for Light Infantry, Combat Engineers and Special Operations Forces.</p>		

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<p>Project EP4: 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 which allows enemy forces to see the trace round and track its trajectory back to the shooter. OWL program's objective is to develop and field a full day/night tracer round, 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 and later followed by 0.50 Caliber cartridges. FY 2018 funding will support post Milestone B (MS B) activities to include Engineering and Manufacturing Development (EMD).</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 2018 funding supports Engineering and Manufacturing Development (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 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. Follow-on effort to reduce the weight on the .50 Cal starts in FY 2022.</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 40mm Improved High Explosive Dual Purpose (I-HEDP) is a new capability identified as a Warfighter requirement in the 40mm High Velocity I-HEDP Capability Development Document. The I-HEDP tactical cartridge provides the warfighter with the ability of achieving the required lethal effects against enemy personnel in the open, and to defeat personnel targets in defilade position. Additionally, the I-HEDP cartridge will be able to defeat unarmored and lightly armored vehicles. FY 2018 dollars support the development of the request for proposal, Bid Sample planning and testing, initiation of technical design, and programmatic oversight activities.</p> <p>Project EU7: The Enhanced Lethality Cannon Munitions (ELCM) project will evaluate, develop and qualify new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to production. The ELCM project will support testing</p>		

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<p>of the Israeli Military Industries (IMI) Systems M999 advanced cluster munition, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition 22 December 2016. The project will complete a safety and performance evaluation of the M999 munition in currently fielded U.S. Army 155mm cannon artillery weapon systems (M777A2, M109A6) and integration of the M999 into US Army fire control software systems. The ELCM project will accelerate the qualification of Lithographic Fragmentation Technology (LFT) 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. The project addresses requirements for increased lethality of 155mm high explosive unitary projectiles (Initial Draft Requirements for the XM1128 with Lithographic Fragmentation Technology, 24 February 2017). FY 2018 funding will support the completion of the Fire Control Integration (FCI) for the M999, the acceleration and initiation of Engineering & Manufacturing Development (EMD) of the XM1128 LFT, and the completion of XM1128 LFT EMD prototyping to begin Production Qualification Testing (PQT) series.</p> <p>Project EU8: The Improved Multi-Option Fuze project will integrate the results of BA4 PE 0603639A Project EU2 and qualify/Type Classify (TC) new improved Multi-Option Fuzes (iMOFA/iMOFM) with Government-owned Next Generation Proximity Sensor (NGPS) capabilities containing 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. Continuing FMS sales of non-precision artillery and mortar ammunition fuzes containing proximity technology will increase the incidence of reverse engineering (RE) and threat of electronic countermeasures (ECM). If realized, these threats will negate the current battlefield advantages of U.S. troops. The pending policy-driven loss of Cannon DPICM will further increase the importance of NGPS / Height of Burst fuzing capabilities to efficiently engage enemy target sets. This project will develop and qualify safe, affordable, reliable Proximity/HoB fuzing solution for non- precision Cannon artillery and Mortar munitions that are resistant to adversary exploitation via ECM and RE threats. FY 2018 funding will support the preparation and award of the Engineering and Manufacturing Development (EMD) contract, and support the design, development, and fabrication of initial improved Multi-option fuzes for follow-on engineering tests and qualification of a new iMOFA/iMOFM TDP based on Government-owned Next Generation Proximity Sensor (NGPS) with Built-In HOB/ DEF technology.</p> <p>Project EW1: 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. FY 2018 supports Engineering and Manufacturing Development (EMD) effort for competing prototypes and initiates EMD design activities. The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door creating an entry point into a building or other structure. This capability is critical during Urban Operations, all while having stand-off ability to conduct ballistic breach at ranges up to 50 meters away, with a single-shot, and without pause between actual breach and entry of initial force. The 40mm DB cartridge will provide the small unit with the capability to conduct breaching operations; allowing the Warfighter to create an entry point in a structure allowing an assault element to enter and begin clearing operations, which is the most difficult type of operation that Soldiers may face in an urban environment. The 40mm DB cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. FY 2018 supports Milestone B approval, Source Selection Planning and Evaluation, Government Technical Development, Bid Sample Testing, and EMD Award.</p>		

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<p>Project FA6: The 30mm Lethality program funds development of a suite of 30x173mm caliber cartridges, which includes anti-personnel tactical and training cartridges and anti-materiel tactical and training cartridges. The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV) and any Army Fighting Vehicles that are equipped with a 30x173mm weapon system. The tactical cartridges will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging dismounted infantry and like armored vehicles. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This program will leverage earlier efforts in support of the Stryker Operational Needs Statement for Increased Lethality. FY 2018 funding will support ammunition qualification activities and development of performance specifications. FY 2018 effort also includes preparation activities for developing/qualifying a 30x173mm Programmable Airburst Munition (PABM) for production. The objective is to field airburst capable 30x173mm cartridges and programming/communication units for use in Stryker ICV and/or Army Future Fighting Vehicles.</p> <p>Project S36: 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. On going development addresses performance in GPS degraded environments as well as compatibility with the Army's new long range cannon and projectiles which will be fielded during the PGK Life Cycle. FY 2018 funding will support design maturation of a PGK and a key GPS subsystem, execution of PGK anti-jam concept and subsystem development and maturation, and perform System Design Review as an entry point into Prototype development and testing.</p>						
B. Program Change Summary (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget		21.379	80.365	130.596	-	130.596
Current President's Budget		18.037	99.165	145.232	-	145.232
Total Adjustments		-3.342	18.800	14.636	-	14.636
• Congressional General Reductions		-	-			
• Congressional Directed Reductions		-	-			
• Congressional Rescissions		-	-			
• Congressional Adds		-	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-	-			
• SBIR/STTR Transfer		-	-			
• Adjustments to Budget Years		-3.342	18.800	14.636	-	14.636

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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) 613 / MORTAR SYSTEMS			
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
613: MORTAR SYSTEMS	-	0.000	25.148	20.115	-	20.115	32.927	25.566	10.478	8.300	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
<p>The High Explosive Guided Mortar (HEGM) project 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. 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.</p> <p>The Weaponized Universal Lightweight Fire-control (WULF) project 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 improve the accuracy of the M252 mortar.</p>												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: HEGM								-	23.148	17.780	-	17.780
Description: Engineering and Manufacturing Development Phase (EMD).												
FY 2017 Plans:												
Project initiation to enter into the EMD phase. Activities include Materiel Development Decision (MDD) approval, Milestone B Approval, award of development efforts, and initiation of preliminary design.												
FY 2018 Base Plans:												
Project will continue in the EMD phase. Activities will include Preliminary Design Review (PDR), award of follow on developmental efforts, and initiation of detailed design phase.												
Title: WULF								-	2.000	2.335	-	2.335
Description: Engineering development and software integration.												
FY 2017 Plans:												

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B. Accomplishments/Planned Programs (\$ in Millions)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Engineering development and software refinement of matured prototype to support the off Line-Replaceable-Unit Environmental test.						
<i>FY 2018 Base Plans:</i> Project will continue in the EMD phase. Activities will include Critical Design Review (CDR), engineering development, and software refinement of matured prototype to support the off Line-Replacement-Unit Environmental test and Software Development Engineering testing.						
Accomplishments/Planned Programs Subtotals		-	25.148	20.115	-	20.115
C. Other Program Funding Summary (\$ in Millions)						
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	
• E25511: HEGM	-	-	-	-	-	
• K99200: WULF	-	-	-	-	-	
						Cost To Complete
						Total Cost
						18.200
						25.186
						445.114
						5.600
						7.700
						23.118
						36.418
Remarks						
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D. Acquisition Strategy						
HEGM - The Acquisition Strategy was approved by the Milestone Decision Authority (MDA) in 2Q FY 17. HEGM will be procured using a Performance Specification (P-Spec). The strategy will use a DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiative and a Federal Acquisition Regulations (FAR) contract. The DOTC OTA initiative is intended to result in multiple awards to cover Preliminary Design Phase requirements for FY 17. A single Full and Open FAR contract is anticipated to be awarded for the completion of EMD, Low Rate Initial Production (LRIP) and first 3 years of Full Rate Production (FRP).						
WULF - Was developed under the U.S. Army Armament Research, Development and Engineering Center (ARDEC) Science & Technology initiative and currently assessed at Technology Readiness Level (TRL) 6 maturity (prototype demonstrated in a relevant environment). An Acquisition Decision Memorandum (ADM) in will be approved in 3Q FY 17 by PEO Ammunition. The project will be managed as a Modification Work Order (MWO) to M252A1 with a tailored Acquisition Strategy. Leveraging existing FIRECON-F and/or DOTC contract to multiple vendors for development during EMD phase 4Q FY 2017. Type Classification is anticipated in 2Q FY 2021. It is anticipated that a new production contract will be awarded under full and open competition. FRP is expected to begin in 4Q FY 2021 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: FY 2018 Army												Date: May 2017			
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Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Phase 1	MIPR	DoD Ordnance Technology Consortium (DOTC) - General Dynamics OTS : Bothell, WA	0.000	-		5.200	Jun 2017	-		-		-	0.000	5.200	5.200
HEGM System Development Phase 1	MIPR	DoD Ordnance Technology Consortium (DOTC) - BAE Systems : Nashu, NH	0.000	-		5.200	Jun 2017	-		-		-	0.000	5.200	5.200
HEGM System Development Phase 1	MIPR	DoD Ordnance Technology Consortium (DOTC) - Orbital ATK : Plymouth, MN	0.000	-		5.200	Jun 2017	-		-		-	0.000	5.200	5.200
HEGM System Development Phase 2	C/CPIF	TBD : TBD	0.000	-		-		11.795	Jul 2018	-		11.795	0.000	11.795	54.057
HEGM System Development Phase 3	C/CPIF	TBD : TBD	0.000	-		-		-		-		-	42.262	42.262	0.000
HEGM - Fire Control	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		0.880	May 2017	1.070	Dec 2017	-		1.070	3.200	5.150	5.150
WULF System Development	C/CPFF	TBD : TBD	0.000	-		0.588	Sep 2017	0.741	Mar 2018	-		0.741	3.521	4.850	4.850
Subtotal			0.000	-		17.068		13.606		-		13.606	48.983	79.657	79.657
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 - Project Manager Office	PO	Office of the Project Manager (PM)	0.000	-		2.300	May 2017	0.975	Dec 2017	-		0.975	2.113	5.388	5.388

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev						Project (Number/Name) 613 / MORTAR SYSTEMS			
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ													
HEGM - ARDEC Engineering Support	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		4.368	May 2017	1.840	Dec 2017	-		1.840	4.470	10.678	10.678
WULF - Project Manager Office	PO	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.000	-		0.510	May 2017	0.180	Dec 2017	-		0.180	0.733	1.423	1.423
WULF - ARDEC Engineering Support	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		0.902	May 2017	0.617	Dec 2017	-		0.617	1.227	2.746	2.746
Subtotal			0.000	-		8.080		3.612		-		3.612	8.543	20.235	20.235
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.000	-		-		2.100	Mar 2018	-		2.100	15.463	17.563	17.563
WULF - Environmental Testing	MIPR	TBD : TBD	0.000	-		-		0.527	Mar 2018	-		0.527	0.000	0.527	0.527
WULF - System Level Developmental Testing	MIPR	TBD : TBD	0.000	-		-		0.270	Mar 2018	-		0.270	4.282	4.552	4.552

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017		
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) 613 / MORTAR SYSTEMS				

Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Subtotal			0.000	-		-		2.897		-		2.897	19.745	22.642	22.642

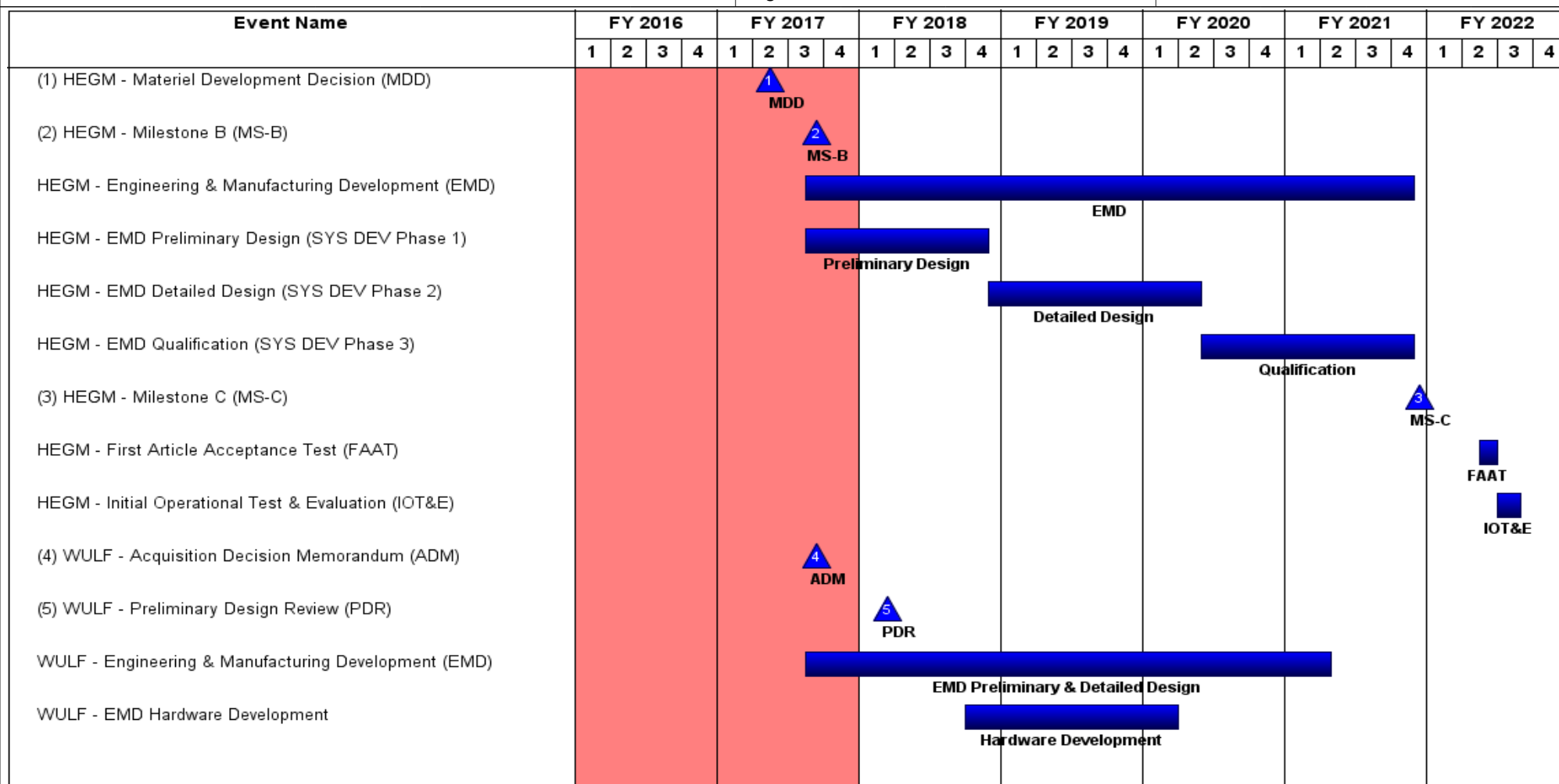
	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-	25.148	20.115	-	20.115	77.271	122.534	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army **Date:** May 2017

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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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army																Date: May 2017																					
Appropriation/Budget Activity 2040 / 5										R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev										Project (Number/Name) 613 / MORTAR SYSTEMS																	
Event Name										FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
										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
WULF - EMD Software Development																		<div>Software Development</div> <div>1</div> <div>CDR</div>				<div></div> <div>OA</div>				<div></div> <div>FAAT</div>				<div></div> <div>2</div> <div>FMR</div>							
(1) WULF - Critical Design Review (CDR)																																					
WULF - Operational Assessment																																					
WULF - First Article Acceptance Test (FAAT)																																					
(2) WULF - Full Materiel Release (FMR)																																					

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) 613 / <i>MORTAR SYSTEMS</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
HEGM - Materiel Development Decision (MDD)	2	2017	2	2017
HEGM - Milestone B (MS-B)	3	2017	3	2017
HEGM - Engineering & Manufacturing Development (EMD)	3	2017	4	2021
HEGM - EMD Preliminary Design (SYS DEV Phase 1)	3	2017	4	2018
HEGM - EMD Detailed Design (SYS DEV Phase 2)	4	2018	2	2020
HEGM - EMD Qualification (SYS DEV Phase 3)	2	2020	4	2021
HEGM - Milestone C (MS-C)	4	2021	4	2021
HEGM - First Article Acceptance Test (FAAT)	2	2022	2	2022
HEGM - Initial Operational Test & Evaluation (IOT&E)	3	2022	3	2022
WULF - Acquisition Decision Memorandum (ADM)	3	2017	3	2017
WULF - Preliminary Design Review (PDR)	1	2018	1	2018
WULF - Engineering & Manufacturing Development (EMD)	3	2017	2	2021
WULF - EMD Hardware Development	4	2018	1	2020
WULF - EMD Software Development	4	2017	2	2020
WULF - Critical Design Review (CDR)	4	2018	4	2018
WULF - Operational Assessment	3	2020	4	2020
WULF - First Article Acceptance Test (FAAT)	2	2021	3	2021
WULF - Full Materiel Release (FMR)	4	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EC1: 40mm Hi Vel and Low Vel Thermal Training Cartridge	-	6.969	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.969
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
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 M781 LV Target Practice and the 40mm M918/M385A1 (Mixed Belt) HV Target Practice. 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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Target Practice Day Night Thermal Cartridges								6.969	-	-	-	-
Description: The Target Practice Day Night Thermal (TP-DNT) Cartridges are 40mm grenade training cartridges												
FY 2016 Accomplishments: FY 2016 performed developmental engineering test activities for both HV and LV variants.												
Accomplishments/Planned Programs Subtotals								6.969	-	-	-	-
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	
• Target Practice Day Night Thermal: Target Practice Day Night Thermal HV M918E1 Cartridges Procurement (SSN: E05611)	-	118.178	82.276	-	82.276	57.036	81.200	80.860	70.996	Continuing	Continuing	
• Target Praciice Day Night Thermal: Target Practice Day Night Thermal LV M781E1 Cartridges Procurement (SSN: E05610)	-	-	23.000	-	23.000	11.400	16.200	16.200	16.500	Continuing	Continuing	

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EC1 / <i>40mm Hi Vel and Low Vel Thermal Training Cartridge</i>	

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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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 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, after Developmental Test and Evaluation. After completion of EMD, a contract will be awarded for the Low Rate Initial Production (LRIP) with two production year options.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EC4: Non-Standard Simulator Munitions	-	1.915	1.092	2.839	-	2.839	3.184	2.675	2.146	2.185	0.000	16.036
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, mitigate environmental concerns and safety risks associated with realistic scenario based training.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Standardize Special Use Ammunition	1.915	1.092	2.839	-	2.839
Description: Standardize non-standard pyrotechnic battlefield effects currently used by CTCs .					
FY 2016 Accomplishments: Prepare and develop necessary documents to support Material Development Decision (MDD) for non standard simulator munitions.					
FY 2017 Plans: 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.					
FY 2018 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army				Date: May 2017	
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
This project will support the Engineering Manufacturing and Development (EMD) phase for Force on Force Black Smoke signature (burning vehicles, buildings, and equipment). 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	1.915	1.092	2.839	-	2.839

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
• Procurement Ammunition, Army: <i>Simulators, Non-Standard, Special Effects for CTCs; SSN E88404</i>	-	0.979	1.632	-	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 4th Qtr FY2017. 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-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) ED7 / Advanced Multipurpose (AMP) Cartridge			
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
ED7: Advanced Multipurpose (AMP) Cartridge	-	0.000	31.215	31.655	-	31.655	28.018	0.000	0.000	0.000	0.000	90.888
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 2018 will support continuation of the Engineering and Manufacturing Development (EMD) Phase 2 which will include safety and performance testing and the manufacturing and procurement of cartridges for the third Cartridge Integration Test. FY 2018 will also support the Critical Design Review (CDR) and initiation of the Developmental Test and Evaluation (DT&E) cartridge build. Evaluate the scalability for future combat platforms.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Engineering and Manufacturing Development (EMD) Phase 1	-	2.039	-	-	-
Description: Develop, demonstrate and qualify the AMP 120mm large caliber munition.					
FY 2017 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: Downselect / Engineering and Manufacturing Development (EMD) Phase 2	-	29.176	-	-	-
Description: Design, develop and test components and cartridges leading to a design freeze. The final design will then be carried forward to Developmental Test and Evaluation (DT&E) qualification testing to demonstrate the cartridge's ability to meet performance requirements prior to production.					
FY 2017 Plans: 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					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army								Date: May 2017				
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) ED7 / Advanced Multipurpose (AMP) Cartridge				
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
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.												
Title: Engineering and Manufacturing Development (EMD) Phase 2								-	-	31.155	-	31.155
Description: Design, develop and test components and cartridges leading to a design freeze. The final design will then be carried forward to Developmental Test and Evaluation (DT&E) qualification testing to demonstrate the cartridge's ability to meet performance requirements prior to production.												
FY 2018 Base Plans: Engineering Manufacturing Development Phase 2 will continue and include the execution of safety and performance tests which will optimize the subsystems for performance. Cartridges will also be manufactured and procured for the third Cartridge Integration Test. In 3Q FY 2018, the Critical Design Review (CDR) will occur followed by the initiation of the Developmental Test and Evaluation (DT&E) cartridge build.												
Title: Evaluation for Future Combat Platforms								-	-	0.500	-	0.500
Description: Evaluation of the scalability for future combat platforms.												
FY 2018 Base Plans: Evaluation of the scalability for future combat platforms.												
Accomplishments/Planned Programs Subtotals								-	31.215	31.655	-	31.655
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: 0603639A / 656): 120mm Cartridge (Advanced Multipurpose-AMP)	26.485	-	-	-	-	-	-	-	-	0	26.485	
• AMP (SSN: E88105): 120mm Advanced Multipurpose (AMP) Cartridge	-	-	-	-	-	25.000	30.000	40.000	48.000	Continuing	Continuing	
Remarks												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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>Advanced Multipurpose (AMP) Cartridge</i>
<p><u>D. Acquisition Strategy</u></p> <p>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.</p>		
<p><u>E. Performance Metrics</u></p> <p>N/A</p>		

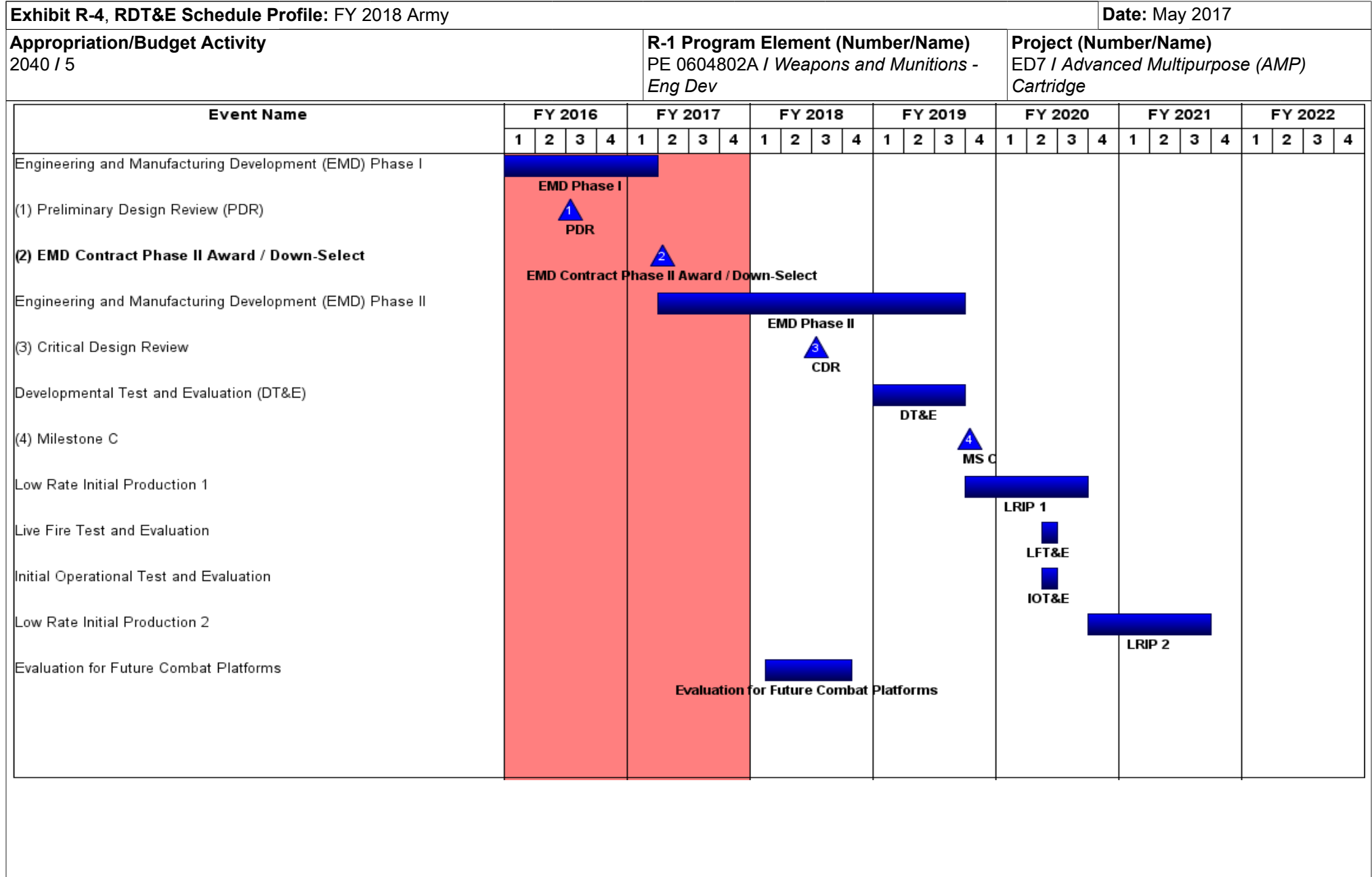
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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev						Project (Number/Name) ED7 / Advanced Multipurpose (AMP) Cartridge			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	Various	Picatinny : NJ	1.747	-		1.148		1.260		-		1.260	Continuing	Continuing	Continuing
Orbital Alliant Techsystems Operations (OATK)	C/CPIF	OATK : Plymouth, Mn	32.450	-		23.728		23.741		-		23.741	Continuing	Continuing	Continuing
Subtotal			34.197	-		24.876		25.001		-		25.001	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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		2.350		-		2.350	Continuing	Continuing	Continuing
Subtotal			4.411	-		2.079		2.350		-		2.350	-	-	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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		2.295		-		2.295	Continuing	Continuing	Continuing
Aberdeen Test Center	MIPR	Aberdeen Proving Ground : MD	2.219	-		2.137		2.009		-		2.009	Continuing	Continuing	Continuing
Subtotal			3.719	-		4.260		4.304		-		4.304	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army										Date: May 2017			
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev					Project (Number/Name) ED7 / Advanced Multipurpose (AMP) Cartridge			
	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	42.327	-		31.215		31.655		-		31.655	-	-	-
Remarks													

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) ED7 / Advanced Multipurpose (AMP) Cartridge	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
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	3	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
Evaluation for Future Combat Platforms	1	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EL9: Ammunitions Logistics Prototyping	-	0.000	0.106	0.686	-	0.686	0.798	0.986	1.041	3.755	0.000	7.372
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note												
Note: The FY16 project EL9 funding of \$2.496M was reprogrammed as follows: \$1.206M to 0605805A project 297, \$0.950M to 0607131A ER5, and \$0.340M to 0604808A project 434.												
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Munitions Survivability and Logistics Enablers								-	0.106	0.686	-	0.686
Description: This program will develop ammunition logistics systems that improve munitions survivability and logistics												
FY 2017 Plans: Integrate low cost thermal indicator with developmental ammunition items and conduct qualification testing.												
FY 2018 Base Plans: Integrate the munitions health monitoring system with developmental ammunition items and conduct qualification tests. Integrate passive time/temperature exposure sensor with developmental ammunition items and conduct qualification testing.												
Accomplishments/Planned Programs Subtotals								-	0.106	0.686	-	0.686
C. Other Program Funding Summary (\$ in Millions)												
N/A												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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
C. Other Program Funding Summary (\$ in Millions)		
<u>Remarks</u>		
D. Acquisition Strategy		
Not applicable		
E. Performance Metrics		
N/A		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EP2: Individual Assault Munition (IAM)	-	0.000	4.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The interim solution to the Individual Assault Munition (IAM) will be a lightweight shoulder launched munition (SLM) capability for combat units at the individual Soldier level. As an improvement over existing SLM, the interim solution will allow Soldiers to conduct Urban Operations with an ability to defeat the enemy protected by a variety of field expedient, structural and lightly armored vehicles. This interim solution will be effective day or night at close ranges with an ability to safely engage targets from within enclosures using single hearing protection. This interim solution will combine the capability of multiple existing SLM which will allow for reduced Soldier load, training complexity and logistics burden for Light Infantry, Combat Engineers and Special Operations Forces. FY 2017 funding will provide the Army the opportunity to evaluate various prototype munitions to achieve emerging increased capability as an interim Individual Assault Munition.

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP4 / One-Way Luminescence for Small Caliber 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
EP4: One-Way Luminescence for Small Caliber Ammo	-	0.000	0.000	2.688	-	2.688	5.698	6.002	11.891	6.400	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The small caliber One Way Luminescence (OWL) tracer 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. The initial focus was on 7.62mm ammunition in FY 2015 followed by 5.56mm in FY 2018; and later followed by the .50 Caliber ammunition. As the technology matures it 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 which allows enemy forces to see the trace round and track its trajectory back to the shooter. OWL program's objective is to develop and field a full day/night tracer round, 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 and later followed by 0.50 Caliber cartridges. FY 2018 funding will support post Milestone B (MS B) activities to include Engineering and Manufacturing Development (EMD).

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Technology Maturation and Risk Reduction (TMRR)	-	-	2.688	-	2.688
Description: One Way Luminescence (OWL) will develop and demonstrate a full day/night tracer technology that eliminates the shortcomings of current legacy tracers.					
FY 2018 Base Plans: FY 2018 efforts will include MS B achievement, contract award for 7.62mm EMD Phase and preparation for Design Verification Tests (DVT).					
Accomplishments/Planned Programs Subtotals	-	-	2.688	-	2.688

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army									Date: May 2017		
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP4 / One-Way Luminescence for Small Caliber 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
• PE 0603639A Project EB8: OWL for Small Caliber Ammunition	2.001	-	1.200	-	1.200	2.200	2.000	-	-	Continuing	Continuing
Remarks											
One Way Luminescence (OWL) is a new tracer technology that will be applied to multiple calibers. The initial focus was on 7.62mm ammunition in FY 2015 followed by 5.56mm in FY 2018; and later followed by the .50 Caliber. As the technology matures it will be transitioned from Project 0603639A EB8 to Project 0654802A EP4 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.											
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 demonstrates 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; and later followed by the .50 Caliber. The new tracer cartridges will replace legacy tracers in each of the various small caliber configurations.											
E. Performance Metrics											
N/A											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo	-	0.000	10.270	11.571	-	11.571	12.887	1.804	7.297	7.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The small caliber Advanced Armor-Piercing (ADVAP) technology applies to multiple calibers.

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 2018 funding supports Engineering and Manufacturing Development (EMD) efforts to include maturing manufacturing as well as optimization of the XM1158 and XM1159 cartridge designs.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: 7.62mm Engineering & Manufacturing Development (EMD)	-	10.270	11.571	-	11.571
Description: Develop, demonstrate, and qualify XM1158 Small Caliber Ammunition 7.62mm ADVAP cartridges in order to defeat threat targets and provide overmatch capability versus a broad spectrum of hard targets.					
FY 2017 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.					
FY 2018 Base Plans: FY 2018 efforts will be focused on Engineering and Manufacturing Development (EMD) to include maturing manufacturing as well as optimization of the XM1158 and XM1159 cartridge designs, and Pre-Production Qualification Test (PPQT) to support Critical Design Review (CDR) and Production Qualification Test (PQT) in FY 2019.					
Accomplishments/Planned Programs Subtotals	-	10.270	11.571	-	11.571

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
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	

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PE 0603639A Project EC2: Advanced Armor-Piercing (ADVAP) for Small Cal Ammunition	7.700	-	-	-	-	3.800	6.900	-	-	Continuing	Continuing

Remarks

The funding line continues the development work for 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

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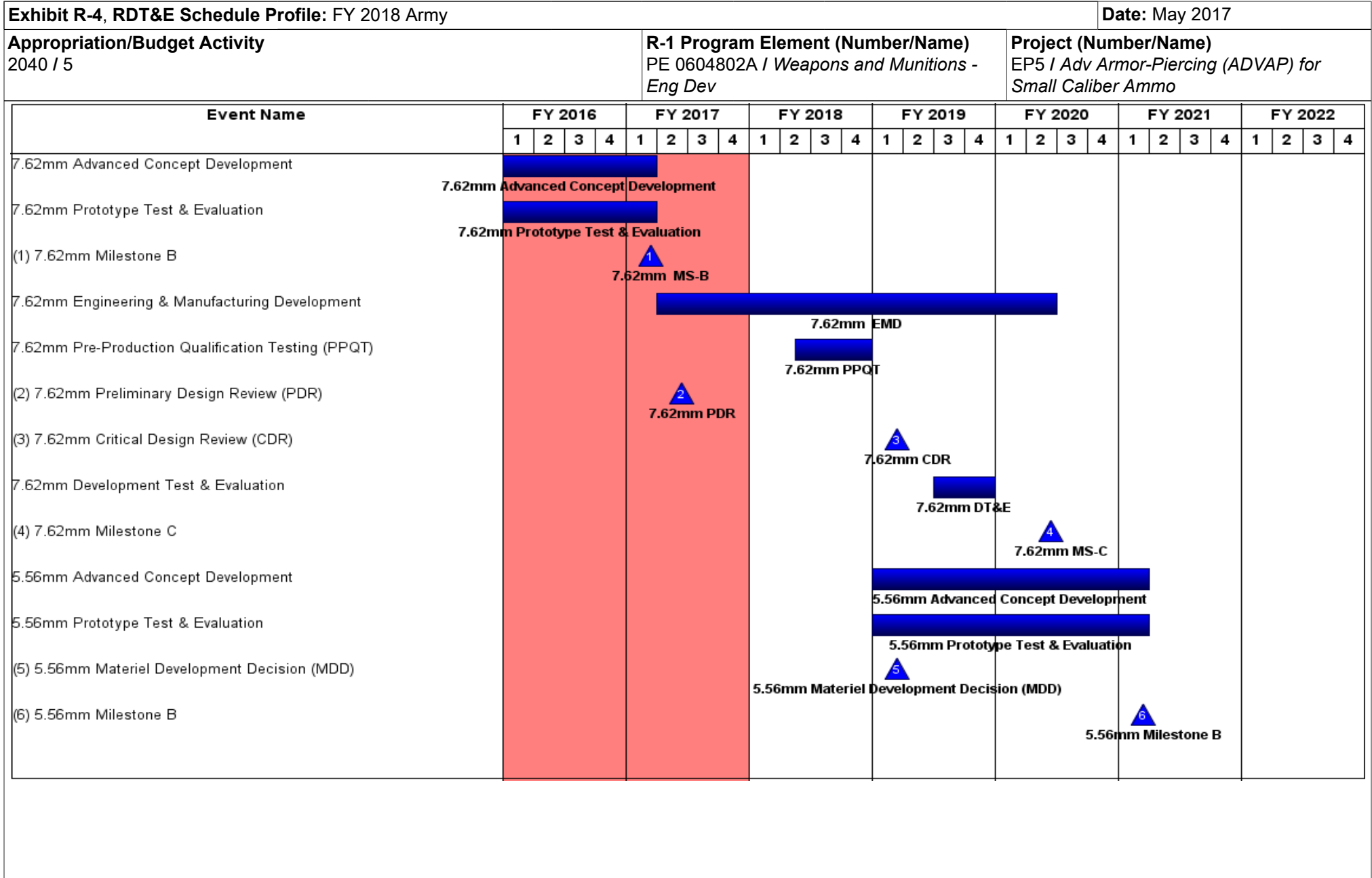
Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev						Project (Number/Name) EP5 / Adv Armor-Piercing (ADVAP) for Small Caliber Ammo			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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		0.271		-		0.271	Continuing	Continuing	Continuing
Raw Materials	Various	TBD : TBD	0.000	-		1.200		4.629		-		4.629	Continuing	Continuing	Continuing
Facilitization and Prototyping	MIPR	Picatinny Arsenal : New Jersey	0.000	-		4.400		1.200		-		1.200	Continuing	Continuing	Continuing
Subtotal			0.000	-		5.800		6.100		-		6.100	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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		3.600		-		3.600	Continuing	Continuing	Continuing
Army Research Lab (ARL)	MIPR	Aberdeen Proving Grounds : Maryland	0.000	-		1.200		0.850		-		0.850	Continuing	Continuing	Continuing
Subtotal			0.000	-		4.470		4.450		-		4.450	-	-	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
U.S. Army Aberdeen Test Center (ATC)	MIPR	Aberdeen Proving Grounds : Maryland	0.000	-		-		0.650		-		0.650	Continuing	Continuing	Continuing
Test Articles	TBD	Picatinny Arsenal : New Jersey	0.000	-		-		0.371		-		0.371	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		1.021		-		1.021	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army											Date: May 2017			
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					
		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	-		10.270		11.571		-		11.571	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army																Date: May 2017												
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										
Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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 PDR			
5.56mm Pre-Production Qualification Testing (PPQT)																									5.56mm PPQT			
(2) 5.56mm Critical Design Review (CDR)																									5.56mm CDR			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
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 Milestone B	1	2017	1	2017
7.62mm Engineering & Manufacturing Development	2	2017	2	2020
7.62mm Pre-Production Qualification Testing (PPQT)	2	2018	4	2018
7.62mm Preliminary Design Review (PDR)	2	2017	2	2017
7.62mm Critical Design Review (CDR)	1	2019	1	2019
7.62mm Development Test & Evaluation	3	2019	4	2019
7.62mm Milestone C	2	2020	2	2020
5.56mm Advanced Concept Development	1	2019	1	2021
5.56mm Prototype Test & Evaluation	1	2019	1	2021
5.56mm Materiel Development Decision (MDD)	1	2019	1	2019
5.56mm Milestone B	1	2021	1	2021
5.56mm Engineering & Manufacturing Development	2	2021	2	2024
5.56mm Preliminary Design Review (PDR)	2	2021	2	2021
5.56mm Pre-Production Qualification Testing (PPQT)	1	2022	3	2022
5.56mm Critical Design Review (CDR)	4	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EP6: Lightweight Cartridge Case for Small Caliber Ammo	-	0.000	1.290	0.000	-	0.000	0.000	0.000	0.000	2.000	0.000	3.290
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. Follow-on effort for .50 Cal in FY 2022.												
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. Follow-on effort to reduce the weight on the .50 Cal starts in FY 2022.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: 7.62mm Engineering and Manufacturing Development (EMD) for Lightweight Small Caliber Ammunition (LSCA)								-	1.290	-	-	-
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 2017 Plans: In FY 2017, the Government completes Phase I Industrial Impacts Study with existing Small Caliber Producers, conducts Source Selection and awards a contract to initiate Phase II activities.												
Accomplishments/Planned Programs Subtotals								-	1.290	-	-	-
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 0603639A Project EL8: Lightweight Cartridge Case for Small Caliber Ammunition	1.299	1.280	2.500	-	2.500	-	-	-	-	0.000	5.079	

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017	
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)											
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Complete</u>	<u>Total Cost</u>
• 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.											
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. The .50 Cal will follow a similar multiphase strategy.											
E. Performance Metrics											
N/A											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP7 / Aviation Airborne Expandable Countermeasures			
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
EP7: Aviation Airborne Expandable Countermeasures	-	0.000	1.431	7.500	-	7.500	7.300	5.800	0.000	16.400	0.000	38.431
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Improvements to countermeasure flares	-	1.431	7.500	-	7.500
Description: This program will develop improvements to legacy countermeasure flare solutions and qualify them for Army use.					
FY 2017 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.					
FY 2018 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	-	1.431	7.500	-	7.500

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017	
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EP7 / Aviation Airborne Expandable Countermeasures			
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</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>	1.662	3.400	1.000	-	1.000	1.600	-	-	2.600	0	10.262
Remarks											
D. Acquisition Strategy											
The Acquisition strategy is under development and will be approved by the Milestone Decision Authority (MDA) in 4Q FY2017. 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-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EU4 / 40mm HV Improved High Explosive Dual Purpose			
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
EU4: 40mm HV Improved High Explosive Dual Purpose	-	0.000	0.303	3.191	-	3.191	7.288	13.207	2.970	2.341	0.000	29.300
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note N/A												
A. Mission Description and Budget Item Justification The 40mm Improved High Explosive Dual Purpose (I-HEDP) is a new capability identified as a Warfighter requirement in the 40mm High Velocity I-HEDP Capability Development Document. The I-HEDP tactical cartridge provides the warfighter with the ability of achieving the required lethal effects against enemy personnel in the open, and to defeat personnel targets in defilade position. Additionally, the I-HEDP cartridge will be able to defeat unarmored and lightly armored vehicles. FY 2018 dollars support the development of the request for proposal, Bid Sample planning and testing, initiation of technical design, and programmatic oversight activities.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Pre Engineering Manufacturing Development Activities								-	0.303	-	-	-
Description: Pre-award activities need to be completed prior to the start of EMD.												
FY 2017 Plans: Funds in FY 2017 supports key accomplishments to include the development/approval of Acquisition Strategy, Milestone B activities, and procurement support documents.												
Title: Engineering Manufacturing Development Activities								-	-	3.191	-	3.191
Description: After Milestone B approval, Request for Proposal (RFP) documents and EMD Bid Sample planning and testing needs to be accomplished.												
FY 2018 Base Plans: Funding in FY 2018 supports key activities in preparation for the Milestone B decision, Request for Proposal, the Engineering and Manufacturing Development (EMD) Bid sample testing, initiation of technical design activities, and programmatic oversights.												
Accomplishments/Planned Programs Subtotals								-	0.303	3.191	-	3.191

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
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 HV Improved High Explosive Dual Purpose</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy The 40mm High Velocity Improved High Explosive Dual Purpose (I-HEDP) cartridge will be developed through a competitive EMD program. Milestone B approval is expected at the end of 1QTR FY 2018, followed by the award to one EMD contractor after the bid sample testing and source selection evaluation. The contractor will mature the I-HEDP cartridge through Design Engineering Test (DET). Shortcomings and deficiencies will be corrected prior to subjecting the final design to the Developmental Test & Evaluation. The test results will support the documentation for Milestone C and Type Classification-Limited Procurement (TC-LP), which is scheduled for the end of 3QTR FY 2021. After Milestone C is achieved, a contract will be awarded for Low Rate Initial Production (LRIP) followed by two production year options.		
E. Performance Metrics N/A		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EU7: Enhanced Lethality Cannon Munitions	-	0.000	8.000	20.500	-	20.500	8.000	8.000	8.000	0.000	0.000	52.500
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The Enhanced Lethality Cannon Munitions (ELCM) project will evaluate, develop and qualify new lethality technologies for 155mm cannon artillery munitions and evaluate their effectiveness in mitigating evolving and derived capability gaps, and support transition to production. The ELCM project will support testing of the Israeli Military Industries (IMI) Systems M999 advanced cluster munition, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition 22 December 2016. The project will complete a safety and performance evaluation of the M999 munition in currently fielded U.S. Army 155mm cannon artillery weapon systems (M777A2, M109A6) and integration of the M999 into US Army fire control software systems. The ELCM project will accelerate the qualification of Lithographic Fragmentation Technology (LFT) 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. The project addresses requirements for increased lethality of 155mm high explosive unitary projectiles (Initial Draft Requirements for the XM1128 with Lithographic Fragmentation Technology, 24 February 2017).												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: 155mm M999 IMI Projectile with M99 Submunitions								-	8.000	2.000	-	2.000
Description: M999 testing assessment of performance, safety, and UXO rates.												
FY 2017 Plans: Conduct UXO and safety testing on the M999 155mm IMI Projectile to support Vice Chief of Staff Army (VCSA) briefing scheduled for November 2017.												
FY 2018 Base Plans: Complete Fire Control Integration (FCI) for the M999.												
Title: 155mm XM1128 High Explosive Projectile								-	-	18.500	-	18.500
Description: Evaluate, Develop, and Qualify Enhanced Lethality Technologies.												
FY 2018 Base Plans: Accelerate and initiate Engineering & Manufacturing Development (EMD) of the XM1128 LFT. Complete EMD prototyping to begin Production Qualification Testing (PQT) series.												
Accomplishments/Planned Programs Subtotals								-	8.000	20.500	-	20.500

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
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	

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

<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BA4 PE 0603639A Project EU1: <i>Enhanced</i> <i>Lethality Cannon Munitions</i>	-	9.866	10.000	-	10.000	-	-	-	-	0	19.866

Remarks

D. Acquisition Strategy

XM1128 High Explosive munition will be accelerated for qualification, per HQDA G-8 Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition (DPICM) 22 December 2016, as an inherent part of the Rapid Bridging solution for 155mm DPICM.

Prototyping will be awarded in 1Q FY 2018 through a DoD Ordnance Technology Consortium (DOTC) contracts to multiple vendors (subcontractors to U.S. Government system integrator) through EMD. The U.S. Government will lead EMD effort to complete development by end 2Q FY 2020. Milestone C approval is anticipated in 2Q FY 2020.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
XM1128 LFT Hardware	MIPR	Various : TBD	0.000	-		-		10.070		-		10.070	0.967	11.037	0.000
Subtotal			0.000	-		-		10.070		-		10.070	0.967	11.037	0.000
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
M999 Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.000	-		0.240		0.200		-		0.200	0.000	0.440	0.000
M999 Engineering Support	MIPR	Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		1.300		1.800		-		1.800	0.000	3.100	0.000
XM1128 Program Management	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	0.000	-		-		1.000		-		1.000	1.500	2.500	0.000
XM1128 Engineering Support	MIPR	Armament Reasech Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.000	-		-		3.960		-		3.960	5.940	9.900	0.000
Subtotal			0.000	-		1.540		6.960		-		6.960	7.440	15.940	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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			
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
M999 Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.000	-		1.100		-		-		-	0.000	1.100	0.000
M999 Testing	MIPR	Combating Terrorism Technical Support Office (CTTSO) : Israel	0.000	-		5.360		-		-		-	0.000	5.360	0.000
XM1128 Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.000	-		-		2.089		-		2.089	1.793	3.882	0.000
XM1128 Testing	MIPR	Naval Surface Warfare Center (NSWC) – Dahlgren : Dahlgren, VA	0.000	-		-		1.031		-		1.031	0.000	1.031	0.000
XM1128 Testing	MIPR	National Technical Systems (NTS) : Camden, AR	0.000	-		-		0.350		-		0.350	0.000	0.350	0.000
Subtotal			0.000	-		6.460		3.470		-		3.470	1.793	11.723	0.000
			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	-		8.000		20.500		-		20.500	10.200	38.700	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army																	Date: May 2017												
Appropriation/Budget Activity										R-1 Program Element (Number/Name)										Project (Number/Name)									
2040 / 5										PE 0604802A / Weapons and Munitions - Eng Dev										EU7 / Enhanced Lethality Cannon Munitions									
Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				
	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	
M999 IMOD Qual Testing Israel																													
M999 Testing																													
M999 Fire Control Integration																													
(1) M999 Final Report																													
XM1128 Prototyping; BA4 PE 0603639A EU1																													
(2) XM1128 Preliminary Design Review (PDR)																													
XM1128 Lethality Testing; BA4 PE 0603639A EU1																													
XM1128 Lethality Assessment; BA4 PE 0603639A EU1																													
XM1128 Baseline Prototyping																													
(3) XM1128 Critical Design Review (CDR)																													
XM1128 Performance Qualification Testing (PQT)																													
(4) XM1128 Milestone C																													

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EU7 / <i>Enhanced Lethality Cannon Munitions</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
M999 IMOD Qual Testing Israel	4	2017	2	2018
M999 Testing	1	2018	1	2018
M999 Fire Control Integration	2	2018	2	2019
M999 Final Report	4	2018	4	2018
XM1128 Prototyping; BA4 PE 0603639A EU1	3	2017	4	2017
XM1128 Preliminary Design Review (PDR)	4	2017	4	2017
XM1128 Lethality Testing; BA4 PE 0603639A EU1	4	2017	4	2017
XM1128 Lethality Assessment; BA4 PE 0603639A EU1	4	2017	1	2018
XM1128 Baseline Prototyping	1	2018	3	2018
XM1128 Critical Design Review (CDR)	3	2018	3	2018
XM1128 Performance Qualification Testing (PQT)	3	2018	4	2019
XM1128 Milestone C	2	2020	2	2020

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 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
EU8: Improved Multi-Option Fuze	-	0.000	0.000	8.000	-	8.000	8.000	10.000	0.000	0.000	0.000	26.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note Project EU8 is not a new start in FY2018; the program is a continuation from PE 0603639A Project EU2 Improved Multi-Option Fuze (iMOFA/iMOFM).												
A. Mission Description and Budget Item Justification This project will integrate the results of BA4 PE 0603639A Project EU2 and qualify/Type Classify (TC) new improved Multi-Option Fuzes (iMOFA/iMOFM) with Government-owned Next Generation Proximity Sensor (NGPS) capabilities containing 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. Continuing FMS sales of non-precision artillery and mortar ammunition fuzes containing proximity technology will increase the incidence of reverse engineering (RE) and threat of electronic countermeasures (ECM). If realized, these threats will negate the current battlefield advantages of U.S. troops. The pending policy-driven loss of Cannon DPICM will further increase the importance of NGPS / Height of Burst fuzing capabilities to efficiently engage enemy target sets. This project will develop and qualify safe, affordable, reliable Proximity/ HoB fuzing solution for non- precision Cannon artillery and Mortar munitions that are resistant to adversary exploitation via ECM and RE threats.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Improved Multi-Option Fuze Development								-	-	8.000	-	8.000
Description: Develop and qualify improved multi-option fuze technologies.												
FY 2018 Base Plans: Will prepare and award the Engineering and Manufacturing Development (EMD) contract as well as the EMD design, development, and fabrication of initial improved Multi-option fuzes for follow-on engineering tests and qualification of new iMOFA/iMOFM TDP based on Government-owned Next Generation Proximity Sensor (NGPS) w/Built-In HOB DEF technology.												
Accomplishments/Planned Programs Subtotals								-	-	8.000	-	8.000

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017	
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			
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
• BA4 PE 0603639A Project EU2: Improved Multi-Option Fuze (iMOFA/iMOFM)	-	-	-	-	-	-	-	-	-	0	0.000
Remarks Project EU8 is not a new start in FY2018; the program is a continuation from PE 0603639A Project EU2 Improved Multi-Option Fuze (iMOFA/iMOFM).											
D. Acquisition Strategy Improved Multi-Option Fuze programs of record via subsequent Engineering and Manufacturing Development (EMD) program for Type Classification (TC) 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. Qualified iMOFA will be a TRL 8 TC design with a mature TDP for production. Parallel iMOFM effort will be a qualified TRL 8 design and replace current MOFMs in appropriate ongoing production mortar cartridges.											
E. Performance Metrics N/A											

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) EW1 / 40mm LV High Explosive Air Burst, XM1166			
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
EW1: 40mm LV High Explosive Air Burst, XM1166	-	0.000	0.353	9.678	-	9.678	13.412	14.195	21.553	1.500	0.000	60.691
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds in the 0604802A EW1 40mm program beginning in FY 2018 include both the 40mm Low Velocity High Explosive Air Burst (HEAB) XM1166 and 40mm Low Velocity Door Breach (DB) XM1167 funds. The DB XM1167 funds will be on this line until a separate funding line is established. The 40mm Door Breach Program is a new start in FY 2018.

A. Mission Description and Budget Item Justification

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. FY 2018 supports Engineering and Manufacturing Development (EMD) effort for competing prototypes and initiates EMD design activities.

The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door creating an entry point into a building or other structure. This capability is critical during Urban Operations, all while having stand-off ability to conduct ballistic breach at ranges up to 50 meters away, with a single-shot, and without pause between actual breach and entry of initial force. The 40mm DB cartridge will provide the small unit with the capability to conduct breaching operations; allowing the Warfighter to create an entry point in a structure allowing an assault element to enter and begin clearing operations, which is the most difficult type of operation that Soldiers may face in an urban environment. The 40mm DB cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm DB cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. FY 2018 supports Milestone B approval, Source Selection Planning and Evaluation, Government Technical Development, Bid Sample Testing, and EMD Award.

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

	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: 40mm Low Velocity High Explosive Air Burst (HEAB), XM1166 EMD	-	0.050	-	-	-
Description: Engineering Manufacturing Development Activities					
FY 2017 Plans:					

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army								Date: May 2017				
Appropriation/Budget Activity 2040 / 5				R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev			Project (Number/Name) EW1 / 40mm LV High Explosive Air Burst, XM1166					
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
FY 2017 supports Milestone B activities and contract preparation.												
Title: 40mm Low Velocity High Explosive Air Burst (HEAB), XM1166 Description: Engineering Manufacturing Development FY 2017 Plans: FY 2017 initiate EMD with one or more contract awards for competing prototypes. FY 2018 Base Plans: FY 2018 Award two contracts for competing prototypes and activities will include fabrication and testing of prototype hardware for design optimization.								-	0.303	5.500	-	5.500
Title: 40mm Low Velocity Door Breach (DB), XM1167 Description: Engineering Manufacturing Development Activities FY 2018 Base Plans: FY 2018 primary activities include Milestone B approval and Bid Sample Test competition. In preparation for contract award, a Performance Specification will be developed, a Request for Proposal (RFP) will be prepared, a release and review of proposals will take place, and source selection will occur.								-	-	4.178	-	4.178
Accomplishments/Planned Programs Subtotals								-	0.353	9.678	-	9.678
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	
• 0603639A 694: Medium Caliber Ammunition 0603639A 694	-	2.170	-	-	-	-	-	-	-	0.000	2.170	
• 40mm LV, IRAP Cartridges: Procurement (SSN E71005)	-	-	-	-	-	-	-	-	11.200	Continuing	Continuing	
Remarks												
D. Acquisition Strategy												
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												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) EW1 / <i>40mm LV High Explosive Air Burst, XM1166</i>
<p>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.</p> <p>The Door Breach cartridge will be developed through a Competitive Bid Sample Test followed by a single award for an EMD program, which will consist of a 12-month qualification effort.</p> <p><u>E. Performance Metrics</u> N/A</p>		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev				Project (Number/Name) FA6 / 30mm Lethality			
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
FA6: 30mm Lethality	-	0.000	0.000	12.000	-	12.000	14.000	9.000	12.000	7.000	0.000	54.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
30mm Lethality is a new start in FY 2018

A. Mission Description and Budget Item Justification
The 30mm Lethality program funds development of a suite of 30x173mm caliber cartridges, which includes anti-personnel tactical and training cartridges and anti-materiel tactical and training cartridges. The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV) and any Army Fighting Vehicles that are equipped with a 30x173mm weapon system. The tactical cartridges will provide an organic direct fire capability to support infantry at a greater range and will improve lethality when engaging dismounted infantry and like armored vehicles. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. This program will leverage earlier efforts in support of the Stryker Operational Needs Statement for Increased Lethality. FY 2018 funding will support ammunition qualification activities and development of performance specifications. FY 2018 effort also includes preparation activities for developing/qualifying a 30x173mm Programmable Airburst Munition (PABM) for production. The objective is to field airburst capable 30x173mm cartridges and programming/communication units for use in Stryker ICV and/or Army Future Fighting Vehicles.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: 30X173mm Suite of Ammunition	-	-	12.000	-	12.000
Description: Engineering and Manufacturing Development Preparatory Activities and Ammunition Qualification Activities.					
FY 2018 Base Plans: FY 2018 primary activities include awarding contract to purchase qualification hardware for suite of four ammunition. And, preparing for contracts to develop/qualify a 30x173mm Programmable Airburst Munition (PABM).					
Accomplishments/Planned Programs Subtotals	-	-	12.000	-	12.000

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

Remarks

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev	Project (Number/Name) FA6 / 30mm Lethality
D. Acquisition Strategy A Request for Proposal (RFP) will be sent to industry soliciting responses to the requirements of Army Performance Specifications for the following items: 30x173mm anti-materiel tactical cartridge, 30x173mm anti-materiel training cartridge, 30x173mm anti-personnel tactical cartridge, and 30x173mm anti-personnel training cartridge, and 30x173mm airburst cartridge. Contracts will be awarded to viable contractors for the development and qualification of each family of cartridges (anti-personnel family and anti-materiel family). Contractor designs will be subjected to Design Verification Tests. Based on technical performance/maturity and cost, production contracts may be awarded for each family of cartridges. The objective is to qualify two contract sources for the each cartridge.		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
Appropriation/Budget Activity 2040 / 5						R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev						Project (Number/Name) FA6 / 30mm Lethality			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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	Various	Picatinny Arsenal : NJ	0.000	-		-		0.400		-		0.400	Continuing	Continuing	Continuing
Ammo Development/Qualification Contract	Option/ TBD	TBD : TBD	0.000	-		-		8.000		-		8.000	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		8.400		-		8.400	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 : NJ	0.000	-		-		2.600		-		2.600	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		2.600		-		2.600	-	-	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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 Proving Ground	MIPR	Aberdeen Proving Ground : Aberdeen, MD	0.000	-		-		1.000		-		1.000	Continuing	Continuing	Continuing
Subtotal			0.000	-		-		1.000		-		1.000	-	-	-
			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	-		0.000		12.000		-		12.000	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army

Date: May 2017

Appropriation/Budget Activity

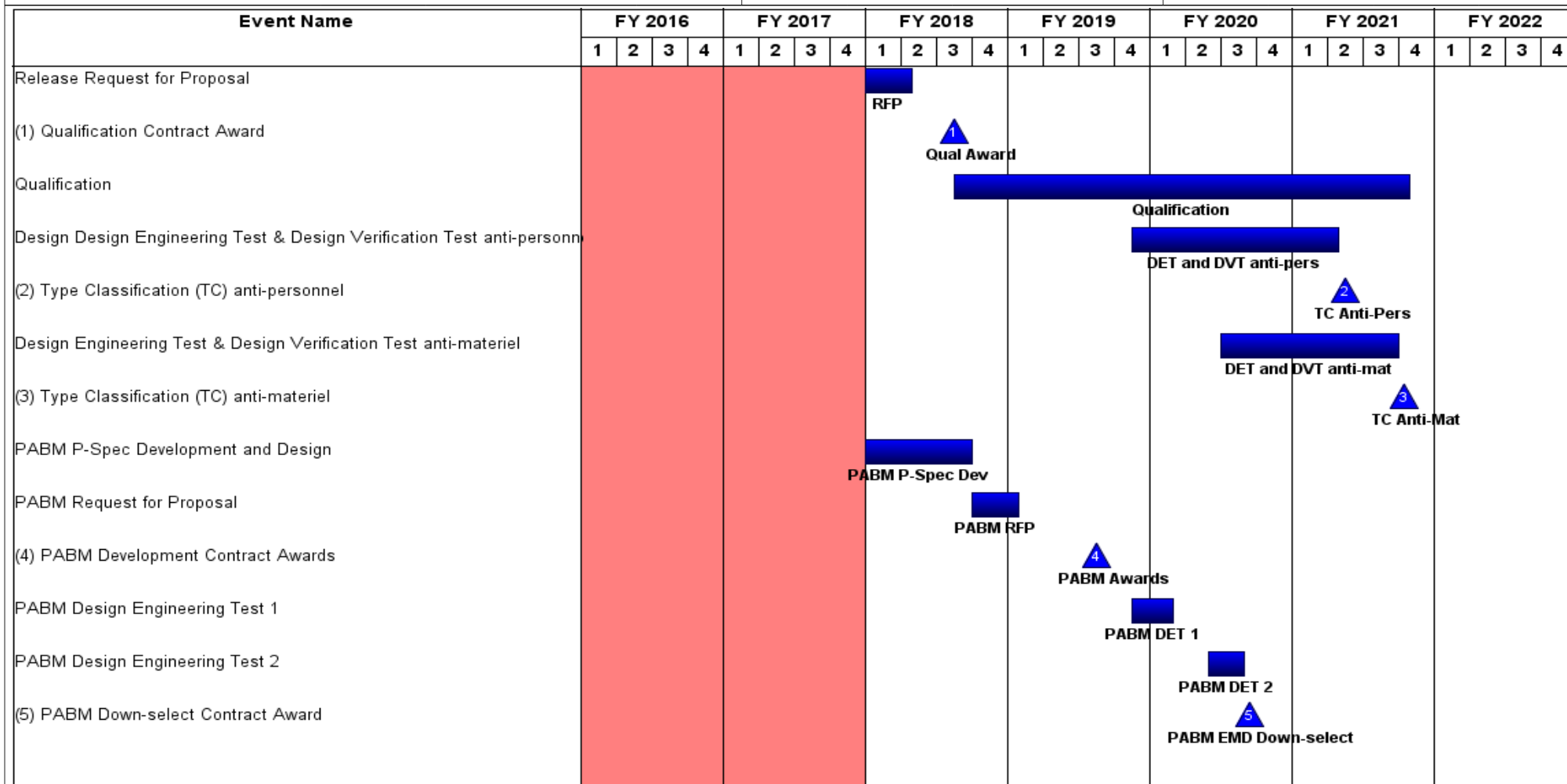
2040 / 5

R-1 Program Element (Number/Name)

PE 0604802A / Weapons and Munitions -
Eng Dev

Project (Number/Name)

FA6 / 30mm Lethality



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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army

Date: May 2017

Appropriation/Budget Activity

2040 / 5

R-1 Program Element (Number/Name)

PE 0604802A / Weapons and Munitions -
Eng Dev

Project (Number/Name)

FA6 / 30mm Lethality

Event Name	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
PABM Engineering & Manufacturing and Development (EMD)																												
PABM Developmental Test & Evaluation (DT&E)																												
(1) PABM Milestone C																												
PABM Live Fire Test and Evaluation (LFT&E)																												
PABM Initial Operational Test and Evaluation (IOT&E)																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i>	Project (Number/Name) FA6 / 30mm Lethality	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Release Request for Proposal	1	2018	2	2018
Qualification Contract Award	3	2018	3	2018
Qualification	3	2018	4	2021
Design Design Engineering Test & Design Verification Test anti-personnel	4	2019	2	2021
Type Classification (TC) anti-personnel	2	2021	2	2021
Design Engineering Test & Design Verification Test anti-materiel	3	2020	3	2021
Type Classification (TC) anti-materiel	4	2021	4	2021
PABM P-Spec Development and Design	1	2018	3	2018
PABM Request for Proposal	4	2018	1	2019
PABM Development Contract Awards	3	2019	3	2019
PABM Design Engineering Test 1	4	2019	1	2020
PABM Design Engineering Test 2	2	2020	3	2020
PABM Down-select Contract Award	3	2020	3	2020
PABM Engineering & Manufacturing and Development (EMD)	4	2020	1	2022
PABM Developmental Test & Evaluation (DT&E)	2	2021	4	2021
PABM Milestone C	1	2022	1	2022
PABM Live Fire Test and Evaluation (LFT&E)	3	2022	1	2023
PABM Initial Operational Test and Evaluation (IOT&E)	3	2022	1	2023

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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			
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
S36: Precision Guidance Kit	-	9.153	15.957	14.809	-	14.809	5.980	8.169	8.384	8.624	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
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. On going development addresses performance in GPS degraded environments as well as compatibility with the Army's new long range cannon and projectiles which will be fielded during the PGK Life Cycle.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Contractor Engineering and Manufacturing Development								6.671	13.707	11.550	-	11.550
Description: Contractor Engineering and Manufacturing Development												
FY 2016 Accomplishments: GPS Design maturation of a PGK with Anti-Jam capability including prototype development and testing.												
FY 2017 Plans: GPS Design maturation of a PGK with Anti-Jam capability including System Requirements Review and System Functional Review.												
FY 2018 Base Plans: Design maturation of a PGK and a key GPS subsystem.												
Title: Government and Engineering Support								2.482	2.250	2.419	-	2.419
Description: Engineering Support												
FY 2016 Accomplishments: Engineering Support of Anti-Jam Development.												
FY 2017 Plans: Engineering Support of Anti-Jam Development.												
FY 2018 Base Plans:												

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army								Date: May 2017			
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total			
Engineering Support of Anti-Jam Development.											
Title: Continue Development/Operational Testing				-	-	0.840	-	0.840			
Description: Development/Operational Test											
FY 2018 Base Plans: Execute PGK anti-jam concept and subsystem development and maturation. Perform System Design Review as an entry point into Prototype development and testing.											
Accomplishments/Planned Programs Subtotals				9.153	15.957	14.809	-	14.809			
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
• E99250: Procurement of Ammunition Army: Precision Guidance Kit (PGK)	64.324	64.162	48.340	20.023	68.363	58.760	60.380	67.222	71.542	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
<p>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. 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 has been qualified for the M795 and M549A1 HE projectiles. This increment of PGK entered Low Rate Initial Production (LRIP) 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 and Initial Operational Capability (IOC) occurred 2Q FY 2016. On going PGK Modernization efforts are focused on addressing performance in a GPS degraded environment as well as compatibility with the Army's new long range 155mm cannon and projectile which are scheduled to be fielded in the same timeframe as the next increment of PGK. The strategy includes competitive DOTC concept development efforts with multiple contractors in FY 2017, followed by a DOTC Risk Reduction concept maturation phase in FY 2018. This will be followed by a competitive FAR Based EMD effort beginning in FY 2019.</p>											
E. Performance Metrics											
N/A											

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
PGK TD Contract	C/CPAF	Alliant Techsystems (ATK) : Plymouth, MN	5.279	-		-		-		-		-	0.000	5.279	5.279
PGK TD Contract	C/CPAF	BAE Systems : Minneapolis, MN	3.103	-		-		-		-		-	0.000	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	Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN	59.953	-		-		-		-		-	0.000	59.953	53.947
PGK EMD - Phase 3a to 5	C/FFP	Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN	32.443	-		-		-		-		-	0.000	32.443	25.117
High Angle Software Configuration	C/CPFF	Raytheon : Ft Wayne, IN	0.105	-		-		-		-		-	0.000	0.105	0.105
Engineering & Technology Assessment. Low Cost Roll Control Solutions	C/CPFF	DoD Ordnance Technology Consortium (DOTC) - General Dynamics Ordnance & Tactical Systems : Bothell, WA	3.996	0.778	Aug 2016	-		-		-		-	0.000	4.774	2.093
Engineering & Technology Assessment. Low Cost Course Correction solutions.	C/CPFF	BAE Systems/ Rokar : Minneapolis, MN	1.000	0.778	Aug 2016	-		-		-		-	0.000	1.778	0.500
DOTC - PGK GPS Anti-Jam Development - Raytheon	MIPR	DoD Ordnance Technology Consortium (DOTC) - Raytheon : Ft Wayne, IN	0.500	0.778	Jul 2016	-		-		-		-	0.000	1.278	0.000
DOTC - PGK GPS Anti-Jam Development - O-ATK	MIPR	DoD Ordnance Technology Consortium (DOTC)	3.987	2.768	Feb 2016	-		-		-		-	0.000	6.755	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army													Date: May 2017		
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				
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
		- Orbital-Alliant Techsystems (O- ATK) : Plymouth, MN													
DOTC - PGK GPS Anti- Jam Development - Rockwell Collins	MIPR	DoD Ordnance Technology Consortium (DOTC) - Rockwell Collins : Cedar Rapids, IA	0.000	0.778	Aug 2016	-		-		-		-	0.000	0.778	0.000
DOTC - PGK GPS Anti- Jam Development	C/CPFF	TBD : Various	0.000	-		12.773	Apr 2017	11.580	Apr 2018	-		11.580	0.000	24.353	40.025
Subtotal			110.482	5.880		12.773		11.580		-		11.580	0.000	140.715	130.285
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Office	Various	Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ	11.520	1.277	Jan 2016	0.837	Jan 2017	0.739	Feb 2018	-		0.739	0.000	14.373	12.764
Government Engineering Support	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	28.818	1.909	Jan 2016	2.243	Jan 2017	1.600	Jan 2018	-		1.600	0.000	34.570	31.798
Management Support	MIPR	Camber : Mt Arlington, NJ	1.936	-		0.104	Jun 2017	0.050	Jun 2018	-		0.050	0.000	2.090	1.936
Miscellaneous Support Contract	MIPR	MITRE Corporation : Fort Monmouth, NJ	0.600	-		-		-		-		-	0.000	0.600	0.000
Jammer Support	MIPR	Electronic Proving Ground (EPG) : Ft Huachuca, AZ	0.316	-		-		-		-		-	0.000	0.316	0.476

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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			
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
PGK Parallel Studies and Analysis Support	MIPR	Command and Control Directorate : Ft Monmouth, NJ	0.300	-		-		-		-		-	0.000	0.300	0.000
LNO Support - Ft. Sill	MIPR	US ARMY Field Artillery Center : Ft. Sill, OK	0.130	0.071	Jun 2016	-		-		-		-	0.000	0.201	0.180
ATEC Support	MIPR	Army Test and Evaluation Command (ATEC) : Aberdeen, MD	0.025	0.016	Sep 2016	-		-		-		-	0.000	0.041	0.025
Subtotal			43.645	3.273		3.184		2.389		-		2.389	0.000	52.491	47.179
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
System Development Testing Increment 1	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	10.442	-		-		-		-		-	0.000	10.442	10.442
Other Development Testing	MIPR	Various : Various	1.769	-		-		-		-		-	0.000	1.769	1.769
Limited User Test	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	1.631	-		-		-		-		-	0.000	1.631	1.631
Initial Operational Test & Evaluation - Increment 1	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving	1.000	-		-		-		-		-	0.000	1.000	1.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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					
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
		Ground (YPG) : Yuma, AZ													
Initial Operational Test & Evaluation - Troop Support	MIPR	Lab Test Center : Ft. Sill, OK	0.731	-		-		-		-		-	0.000	0.731	0.731
Component Air Gun/ Railgun Testing	MIPR	Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ	0.337	-		-		-		-		-	0.000	0.337	0.337
Cold Region Testing	MIPR	Cold Region Test Center : Yuma, AZ	0.300	-		-		-		-		-	0.000	0.300	0.300
Airdrop Testing	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.200	-		-		-		-		-	0.000	0.200	0.200
Development Testing for GPS Anti-Jam	MIPR	Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ	0.590	-		-		0.840	May 2018	-		0.840	0.000	1.430	1.840
Subtotal			17.000	-		-		0.840		-		0.840	0.000	17.840	18.250
			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			171.127	9.153		15.957		14.809		-		14.809	0.000	211.046	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army

Date: May 2017

Appropriation/Budget Activity

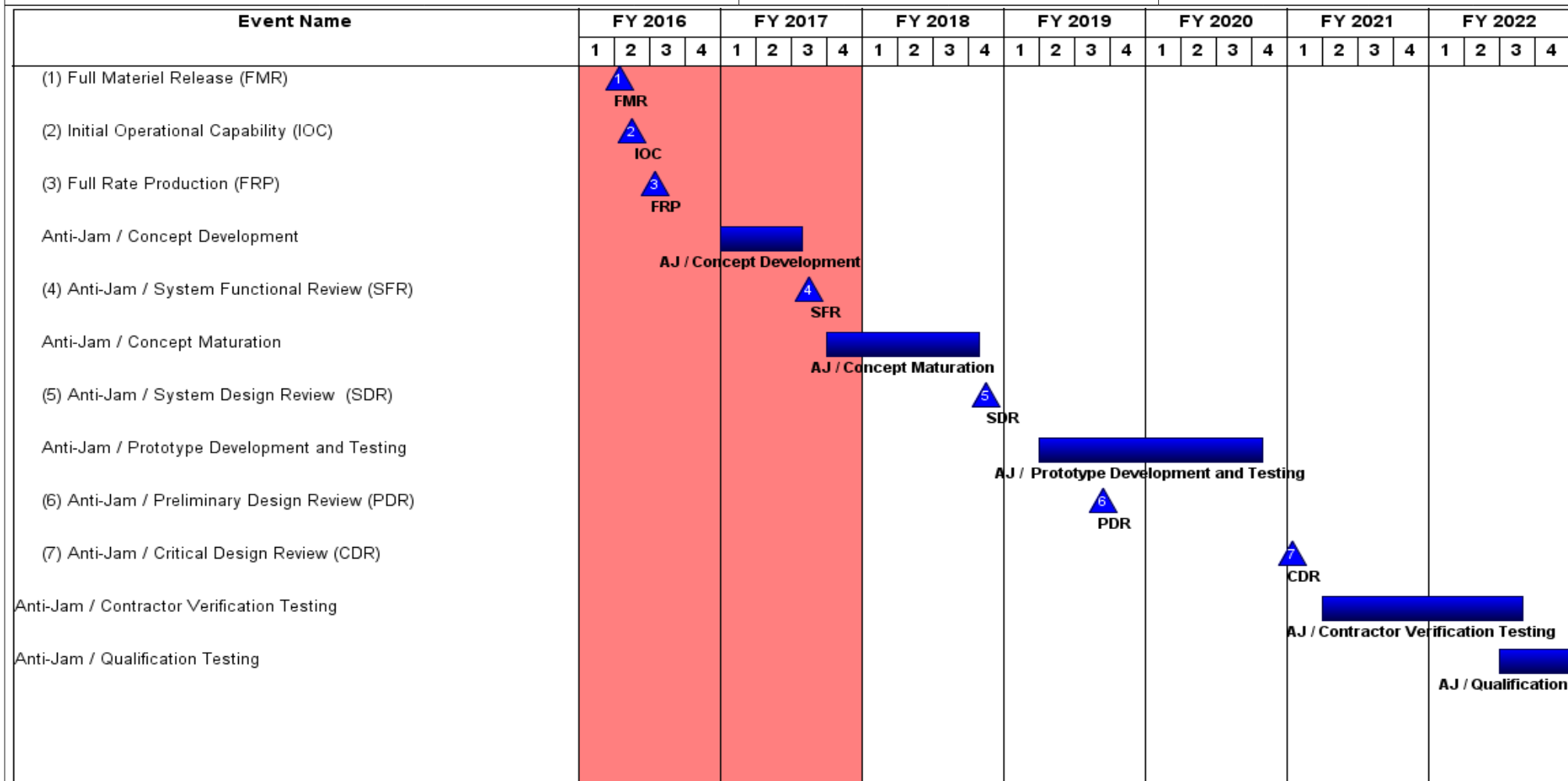
2040 / 5

R-1 Program Element (Number/Name)

PE 0604802A / Weapons and Munitions -
Eng Dev

Project (Number/Name)

S36 / Precision Guidance Kit



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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
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
Full Materiel Release (FMR)	2	2016	2	2016
Initial Operational Capability (IOC)	2	2016	2	2016
Full Rate Production (FRP)	3	2016	3	2016
Anti-Jam / Concept Development	1	2017	3	2017
Anti-Jam / System Functional Review (SFR)	3	2017	3	2017
Anti-Jam / Concept Maturation	4	2017	4	2018
Anti-Jam / System Design Review (SDR)	4	2018	4	2018
Anti-Jam / Prototype Development and Testing	2	2019	4	2020
Anti-Jam / Preliminary Design Review (PDR)	3	2019	3	2019
Anti-Jam / Critical Design Review (CDR)	1	2021	1	2021
Anti-Jam / Contractor Verification Testing	2	2021	3	2022
Anti-Jam / Qualification Testing	3	2022	4	2023