

UNCLASSIFIED

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|--|-------------|---------|---------|--------------|--|---------------|---------|---------|---------|------------------|------------------|------------|
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| Total Program Element | - | 144.389 | 172.744 | 181.023 | - | 181.023 | 134.960 | 99.386 | 64.788 | 27.801 | 0.000 | 825.091 |
| 613: MORTAR SYSTEMS | - | 17.582 | 28.071 | 5.792 | - | 5.792 | 1.410 | 0.000 | 0.000 | 0.000 | 0.000 | 52.855 |
| EC4: Non-Standard Simulator Munitions | - | 0.863 | 3.146 | 2.644 | - | 2.644 | 2.121 | 2.159 | 0.000 | 0.000 | 0.000 | 10.933 |
| ED7: Advanced Multipurpose (AMP) Cartridge | - | 30.390 | 21.802 | 14.100 | - | 14.100 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 66.292 |
| EL9: Ammunitions Logistics Prototyping | - | 0.684 | 2.014 | 2.329 | - | 2.329 | 1.703 | 0.705 | 1.000 | 1.020 | 0.000 | 9.455 |
| EP2: Shoulder-Launched Munitions | - | 3.000 | 0.000 | 4.100 | - | 4.100 | 10.400 | 0.000 | 0.000 | 0.000 | 0.000 | 17.500 |
| EP3: Reduced Range Ammunition - Small Caliber | - | 0.000 | 2.470 | 8.376 | - | 8.376 | 15.000 | 15.250 | 13.200 | 0.000 | 0.000 | 54.296 |
| EP4: One-Way Luminescence for Small Caliber Ammo | - | 0.000 | 6.077 | 8.547 | - | 8.547 | 12.391 | 5.387 | 6.500 | 3.000 | 0.000 | 41.902 |
| EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo | - | 13.318 | 16.748 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 30.066 |
| EP7: Aviation Airborne Expendable Countermeasures | - | 0.000 | 7.213 | 4.920 | - | 4.920 | 4.480 | 8.250 | 0.000 | 0.000 | 0.000 | 24.863 |
| EU4: 40mm HV Improved High Explosive Dual Purpose | - | 2.191 | 7.201 | 13.055 | - | 13.055 | 2.935 | 2.313 | 0.000 | 0.000 | 0.000 | 27.695 |
| EU5: .50 Caliber All-Purpose Tactical cartridge (APTC)* | - | 0.000 | 0.000 | 0.000 | - | 0.000 | 8.500 | 9.400 | 0.000 | 0.000 | 0.000 | 17.900 |
| EU6: 155mm HE Rocket Assist Project Extended Range | - | 0.000 | 6.917 | 8.943 | - | 8.943 | 5.966 | 3.000 | 0.000 | 0.000 | 0.000 | 24.826 |
| EU7: Enhanced Lethality Cannon Munitions | - | 25.600 | 7.905 | 7.908 | - | 7.908 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 41.413 |
| EU8: Improved Multi-Option Fuze | - | 9.730 | 7.905 | 10.000 | - | 10.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 27.635 |

UNCLASSIFIED

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | | |
|--|---|--------|--------|--------|--|--------|--------|--------|--------|------------------|-------|---------|--|
| 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 | | | | | | | | |
| EW1: 40mm Low Velocity Ammunition | - | 13.469 | 13.253 | 14.032 | - | 14.032 | 17.402 | 5.963 | 2.000 | 0.000 | 0.000 | 66.119 | |
| FA6: 30mm Lethality | - | 13.344 | 13.834 | 22.897 | - | 22.897 | 15.860 | 9.797 | 8.000 | 3.000 | 0.000 | 86.732 | |
| FL4: Small Caliber Ammo for Next Gen Squad Weapons | - | 0.000 | 0.000 | 22.880 | - | 22.880 | 30.630 | 28.750 | 25.000 | 11.750 | 0.000 | 119.010 | |
| S36: Precision Guidance Kit | - | 14.218 | 28.188 | 30.500 | - | 30.500 | 3.691 | 3.174 | 3.753 | 3.531 | 0.000 | 87.055 | |
| XV2: Extended Range 120mm Mortar* | - | 0.000 | 0.000 | 0.000 | - | 0.000 | 2.471 | 5.238 | 5.335 | 5.500 | 0.000 | 18.544 | |

*This project's R-2a exhibit has been suppressed due to funding not beginning until after FY 2020

Note

Project EP2, Shoulder-Launched Munitions is a New Start in FY 2020.

Project EP5, Adv Armor-Piercing (ADVAP) for Small Cal Ammo will be realigned to PE 0604601 in FY2021.

A. Mission Description and Budget Item Justification

This Program Element funds multiple efforts for engineering development of weapons and munitions systems.

Project 613, Mortar Systems: This Project supports Fire Control Modernization (FCM) and High Explosive Guided Mortar (HEGM).

The Fire Control Modernization (FCM) Project funds engineering development of Common / Universal Fire Control Systems applicable to Indirect Fire mortar weapon systems. This includes a modernized digital pointing system that will be integrated with the M120A1 120mm mortar weapon systems, M121 120mm mortar weapon systems, and potentially digitize the M252 81mm mortar weapon systems. Fire Control Modernization will replace the current M67 sight unit and upgrade the M95 and M150 fire control systems with modernized pointing device and mount. The modernized pointing device will enhance responsiveness, survivability, mobility, maintainability, and minimize mortar crew exposure to enemy fire. Fire Control Modernization intends to include the addition of round counting capabilities, muzzle velocity sensing, reduced power draw, streamlined communication, and employ a common fire control software solution across mortar systems. FY 2020 funds will support engineering initiatives and prototyping of fire control line replaceable units (LRU) and software.

The High Explosive Guided Mortar (HEGM) Project funded 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. The HEGM Project was terminated in FY 2018 with close-out completion in FY 2019.

UNCLASSIFIED

| | | |
|--|--|--|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | Date: March 2019 |
| Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i> | | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> |
| <p>Project EC4, Non-Standard Simulator Munitions: The Non-Standard Simulator Munitions 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 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 (HiOBE) 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, Advanced Multipurpose (AMP) Cartridge: The Advanced Multi Purpose (AMP) Project is a direct fire line of sight 120mm large caliber munition under development for the Abrams Main Battle Tank. AMP has three modes of operation including point detonate, point detonate delay, and airburst. AMP is the materiel solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50m to 2000m threshold and 50m to 4500m objective, 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' battle carry dilemma by allowing them to load a single munition that is capable of defeating multiple targets including Anti Tank Guided Missile teams, reinforced walls, personnel, light armor, bunkers, and obstacles. The full performance of the AMP is obtained with an Abrams equipped Ammunition Data Link breach modification, the same required by the 120mm M829A4 cartridge that achieved Milestone C in FY 2014 and achieved Full Materiel Release in FY 2015. FY 2020 funds supports continuation of Engineering and Manufacturing Development (EMD) efforts and testing in preparation for Milestone C and transition into Procurement.</p> <p>Project EL9, Ammunition Logistics Prototyping: The Ammunition Logistics Prototyping Project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. FY 2020 funding will be used to continue integrating the munitions health monitoring system with additional ammunition items and conduct qualification tests and continue to integrate passive time/temperature exposure sensors with additional ammunition items and conduct qualification testing.</p> <p>Project EP2, Shoulder-Launched Munitions: This project previously funded the one-time acceleration of the Tandem Warhead type classification and completion of development and testing for use in the Shoulder Launched AT-4 Single-use 84mm Anti-Tank Weapon. The AT-4 Tandem Warhead provides a single shot solution with increased lethality for infantry crew formations against anti-armor and to defeat hardened structures. The AT-4 effort was part of the Secretary of Defense's Close Combat Lethality task force.</p> | | |

UNCLASSIFIED

| | | |
|---|--|--|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | Date: March 2019 |
| Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i> | | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> |
| <p>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 Shoulder Launched Munitions, the 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 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 solution will combine the capability of multiple existing shoulder-launched munitions which will allow for reduced Soldier load, training complexity and logistics burden for Light Infantry, Combat Engineers and Special Operations Forces. FY 2020 funding will provide the Army the opportunity to evaluate various prototype munitions to achieve emerging increased capability as an Individual Assault Munition. The Individual Assault Munition Capabilities Development Document (CDD) was approved on 11 March 2016. The Individual Assault Munition effort is a new start in FY 2020.</p> <p>Project EP3, Reduced Range Ammunition - Small Caliber: The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62mm and .50 caliber Capabilities Development Documents (CDD). The overall objective of Reduced Range Ammunition is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. Reduced Range Ammunition will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The Reduced Range Ammunition cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. FY 2020 funding supports continuing Engineering and Manufacturing Development (EMD) efforts and performing design/verification testing on the 7.62mm variant. FY 2020 funds also support Milestone (MS) B activities to include Preliminary Design Review (PDR) and Engineering and Manufacturing Development (EMD) Contract Award for the .50 caliber variant. FY 2020 funds also supports Reduced Range Ammunition concept development/evaluation for the Next Generation Squad Weapon (NGSW) systems.</p> <p>Project EP4, One-Way Luminescence for Small Caliber Ammo: The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62mm and 5.56mm Families of Ammunition Capabilities Development Documents (CDD) and .50 Caliber Munitions 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. The OWL projects 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 .50 Caliber cartridges and Next Generation Squad Weapons (NGSW) ammunition. FY 2020 funding will support continuing Engineering and Manufacturing Development (EMD) efforts, conducting a Critical Design review (CDR), performing development tests, and a User Assessment (UA) for the 7.62mm variant. FY 2020 also supports concept development/evaluation of OWL tracer solutions for .50 Caliber weapons and NGSW.</p> <p>Project EP5, Adv Armor-Piercing (ADVAP) for Small Caliber Ammo: This Project supports both the Advanced Armor-Piercing ammunition and the Next Generation Squad Weapon (NGSW) Family of Ammunition.</p> <p>- Advanced Armor-Piercing (ADVAP): The ADVAP project is a critical technology development in response to the 7.62mm and 5.56mm Family of Ammunition Capabilities Development Documents (CDD). The nomenclature for the 7.62mm ADVAP is XM1158. The overall objective of the ADVAP project is to develop and Full Materiel Release (FMR) both 7.62mm XM1158 cartridge for the M240 machine gun and ADVAP ammunition in calibers below 7.62mm. The ADVAP ammunition in</p> | | |

UNCLASSIFIED

| | | |
|--|--|------------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | Date: March 2019 |
| 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 | |
| <p>calibers below 7.62mm for the Next Generation Squad Weapons is referred to as the Special Purpose ammunition. The objective is to provide overmatch capability to defeat advanced light armored threats within typical machine gun engagement ranges. No funding has been requested for ADVAP in FY 2020.</p> <p>- Next Generation Squad Weapon (NGSW) Family of Ammunition: The NGSW ammo is a new ammunition technology under development for use in the Next Generation Squad Weapon systems. The objective is to develop and Full Materiel Release (FMR) the new ammunition. No funding requested in FY 2020.</p> <p>Project EP7, Aviation Airborne Expandable Countermeasures: The Aviation Airborne Expandable Countermeasures 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 and aircraft expendables (to include Radio Frequency (RF) expendables).</p> <p>Project EU4, 40mm HV Improved High Explosive Dual Purpose: 40mm High Velocity (HV) High Explosive Dual Purpose - Airburst (HEDP-AB) is a new capability identified in the 40mm High Velocity Improved High Explosive Dual Purpose Cartridge Capability Development Document (CDD) and will provide the Mk19 Mod 3 Grenade Machine Gun (GMG) an airburst capable cartridge with the ability of achieving required lethal effects against enemy targets in the open and in defilade while maintaining the capability to defeat unarmored and lightly armored vehicles. FY 2020 funding supports Engineering and Manufacturing Development (EMD) activities including Design Engineering Test (DET) 1, DET 2, Soldier Touch Point (Limited User Evaluation), Family of Weapon Sights - Crew Served (FWS-CS) Integration, and preparation for the contractor down-selection.</p> <p>Project EU6: The XM1113 High Explosive Extended Range Artillery Projectile is a critical munition that supports the Army's modernization priorities in support of the National Defense Strategy. The XM1113 is a government owned materiel solution for long-range cannon artillery projectiles that will attain ranges of 40km in 39 caliber weapon systems and 70km in future systems. The XM1113 will provide 33% increased range over obsolete and aging M549A1 Rocket Assisted Projectile using a larger, modern rocket motor and optimized aerodynamic airframe. The XM1113 will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. The projectile body is filled with an insensitive munition (IM) high explosive (HE) and a supplementary charge to aid in soldier survivability. FY 2020 funds will support fuze performance evaluation and confirmation with XM1113 for Urgent Materiel Release (UMR) in FY 2021, as well as the continued engineering efforts of the XM1113 maturation in support of a Milestone C in FY 2022.</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 supports testing and assessment of the Israeli Military Industries (IMI) Systems M999 advanced anti-personnel munition and also accelerates the qualification of the 155mm XM1128 High Explosive Projectile including the evaluation of Lithographic Fragmentation Technology (LFT); both of these initiatives support the Army Directed Requirement for a Rapid Bridging Solution for the replacement of the 155mm Dual Purpose Improved Conventional Munition (DPICM). FY 2020 funds will support fuze performance evaluation and confirmation with XM1128, as well as continued Insensitive Munitions (IM) testing, Sequential Environmental Test - Safety (SET-S), and Military Standard</p> | | |

UNCLASSIFIED

| | | |
|--|--|--|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | Date: March 2019 |
| Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i> | | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> |
| <p>Environmental Engineering Considerations and Laboratory Tests (MIL-STD-810). Engineering efforts will support the evaluation of the XM1128 test data to determine that the Program is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C in FY 2021.</p> <p>Project EU8: The Improved Multi-Option Fuze Project (MOFA II/iMOFM) is a technology refresh and modernization effort that provides an incremental capability with technology advancements and performance improvements on the current non-precision artillery and mortar ammunition proximity multi-option fuzes that will increase robustness to electronic countermeasures (ECM), eliminates the susceptibility of reverse engineering (RE), incorporates power source advancements, improves delay mode reliability, and integrates safe & arm improvements. This will develop and qualify safe, affordable, reliable Proximity Height of Burst fuzing solutions with robust Defense Exportability Features (DEF) for non-precision conventional Cannon artillery and Mortar munitions that are resistant to adversary exploitation via ECM and RE threats. FY 2020 will support the preparation and incrementing of Engineering and Manufacturing Development (EMD) contracts, the fabrication of MOFA II and iMOFM hardware to conduct developmental verification tests and Product Qualification Tests (PQT), the iMOFM Critical Design Review (CDR), and the preparations for transition into production.</p> <p>Project EW1: The 40mm Low Velocity 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 Low Velocity HEAB tactical cartridge allows the warfighter to engage targets at increased effective ranges using the 40mm M320 Grenade Launcher. 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. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel 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 2020 will support Design Engineering Test (DET) 2 and DET 3 build, Soldier Touch Point (Limited User Evaluation), Test Readiness Reviews (TRRs) and DET 2 Testing.</p> <p>The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door to create an entry point into a building or other structure. This capability is critical during Urban Operations, 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 efficient breaching operations; allowing the Warfighter to create an entry point into a structure for an assault element to enter and begin clearing operations, one of the most difficult types of operations 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 Door Breach cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. No funding requested in FY 2020.</p> <p>Project FA6: The 30mm Lethality project funds the development of a suite of 30x173mm caliber cartridges, which includes anti-personnel tactical and training cartridges and anti-materiel tactical and training cartridges as well as Airburst Munition cartridges for Urgent Materiel Release (UMR) and Full Materiel Release (FMR). The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV), Next Generation Combat Vehicle (NGCV), 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 light armored vehicles. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. The Airburst munitions will provide the Warfighter with increased lethality against troops in the open, counter defilade and anti-tank guided missiles (ATGM). This project will leverage earlier efforts in support of the Stryker Operational Needs Statement (ONS)</p> | | |

UNCLASSIFIED

| | | | | | | |
|--|--|--|---------|------------------|-------------|---------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | | | Date: March 2019 | | |
| 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 | | | | |
| for Increased Lethality for the 2nd Calvary Regiment (2CR), United States Army Europe (USAREUR) (HQDA ONS 15-20590). FY 2020 funding will support three Design Engineering Tests (DET) and a Design Verification Test (DVT) for the non-airburst 30x173mm suite of ammunition. FY 2020 will also support Milestone B and Engineering and Manufacturing Development (EMD) contract award for the 30x173mm Airburst munition. | | | | | | |
| Project FL4: Next Generation Squad Weapons (NGSW) Family of Ammunition: The Small Caliber Ammo for Next Gen Squad Weapons project is a critical technology development in response to the Soldier Lethality Cross Functional Team (SL CFT) Initial Capability Document (ICD) for the ammunition required to support the rapid prototyping, development, and fielding of the Next Generation Squad Weapons (NGSW) under Section 804 Authority. The objective is to develop and Full Materiel Release (FMR) the new ammunition. The NGSW ammunition is split into two initial variants, the General Purpose (GP) and the Special Purpose (SP). FY 2020 funding supports continuing rapid prototyping/development of the GP projectile, building prototypes and maturing prototypes to provide to the weapon system contractors for performance evaluation, conducting a Critical Design Review (CDR), and conducting prototype testing. FY 2020 also supports continuing rapid prototyping for the SP projectile, conducting a Preliminary Design Review (PDR), conducting an Initial Product Review (IPR), and performing activities to increase prototype capacity to support planned weapon system testing. Follow-on NGSW ammunition types include: tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition. Development efforts on the follow-on NGSW ammunition variants are scheduled to begin in FY 2022. FY 2020 supports initial activities to evaluate potential solutions/prototypes and concepts to satisfy follow-on NGSW ammunition requirements. | | | | | | |
| Project S36: The Precision Guidance Kit (PGK) is a course correcting fuze that provides precision accuracy and efficiency for current and future 155mm High Explosive (HE) projectiles by eliminating a portion of the inherent errors associated with ballistic firing solutions which effectively reduces the number of projectiles required to execute fire missions. PGK utilizes a Global Positioning System (GPS) receiver and internal Guidance and Navigation Computer to accomplish its mission with point detonating and height of burst fuzing functions. The PGK M1156E1 effort will incorporate and qualify state of the art technologies to increase the functionality of PGK in GPS degraded environments as well as compatibility with the Army's new long range cannon (Extended Range Cannon Artillery (ERCA)) and projectiles which will be fielded during the PGK Life Cycle. PGK Anti-Jam (PGK-AJ) supports future 155mm projectiles and M777 Long Range Cannon (LRC) initiatives and Army Modernization Priorities in support of the National Defense Strategy. FY 2020 funding supports the award of the Engineering and Manufacturing Development (EMD) contract initiating system design and prototype development for PGK Anti-Jam. | | | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Previous President's Budget | | 145.232 | 183.100 | 153.853 | - | 153.853 |
| Current President's Budget | | 144.389 | 172.744 | 181.023 | - | 181.023 |
| Total Adjustments | | -0.843 | -10.356 | 27.170 | - | 27.170 |
| • Congressional General Reductions | | -0.119 | -0.215 | | | |
| • Congressional Directed Reductions | | - | -10.141 | | | |
| • Congressional Rescissions | | - | - | | | |
| • Congressional Adds | | 4.178 | - | | | |
| • Congressional Directed Transfers | | - | - | | | |
| • Reprogrammings | | 0.781 | - | | | |
| • SBIR/STTR Transfer | | -5.683 | - | | | |
| • Adjustments to Budget Years | | - | - | 27.170 | - | 27.170 |

UNCLASSIFIED

| | | |
|---|--|------------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army | | Date: March 2019 |
| 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 | |
| <div><div>Change Summary Explanation</div><div>FY 2020 increase of \$13.070 million supports the Army's modernization priorities in support of the National Defense Strategy.</div></div> | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 613: MORTAR SYSTEMS | - | 17.582 | 28.071 | 5.792 | - | 5.792 | 1.410 | 0.000 | 0.000 | 0.000 | 0.000 | 52.855 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| A. Mission Description and Budget Item Justification | | | | | | | | | | | | |
| The Fire Control Modernization (FCM) Project funds engineering development of Common / Universal Fire Control Systems applicable to Indirect Fire mortar weapon systems. This includes a modernized digital pointing system that will be integrated with the M120A1 120mm mortar weapon systems, M121 120mm mortar weapon systems, and potentially digitize the M252 81mm mortar weapon systems. FCM will replace the current M67 sight unit and upgrade the M95 and M150 fire control systems with modernized pointing device and mount. The modernized pointing device will enhance responsiveness, survivability, mobility, maintainability, and minimize mortar crew exposure to enemy fire. FCM intends to include the addition of round counting capabilities, muzzle velocity sensing, reduced power draw, streamlined communication, and employ a common fire control software solution across mortar systems. FY 2020 funds will support engineering initiatives and prototyping of fire control line replaceable units (LRU) and software. | | | | | | | | | | | | |
| The High Explosive Guided Mortar (HEGM) Project funded 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. The HEGM Project was terminated in FY 2018 with close-out completion in FY 2019. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Fire Control Modernization | | | | | | | | 2.242 | - | 5.792 | - | 5.792 |
| Description: The Fire Control Modernization (FCM) initiatives include a modernized digital pointing system that will be integrated with the M120A1 120mm mortar weapon systems, M121 120mm mortar weapon systems, intends to digitize the M252 81mm mortar weapon systems, and will upgrade the M95 and M150 fire control systems with a modernized pointing device, mount displays and streamlined communications. | | | | | | | | | | | | |
| FY 2020 Base Plans: FY 2020 funds will support engineering initiatives and prototyping of fire control line replaceable units (LRU) and software. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|--|----------------|----------------|-------------------------|------------------------|---|----------------|-------------------------|--|--------------------------|-----------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | |
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | Project (Number/Name) 613 / MORTAR SYSTEMS | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | | | | |
| | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | | |
| FY 2020 funding increase supports continuation of Fire Control Modernization efforts. | | | | | | | | | | | |
| Title: HEGM Description: Engineering and Manufacturing Development Phase (EMD). FY 2019 Plans: Project continues in the Detailed Design EMD phase. Activities will include System Design Review (SDR) and initiation of Production Prove Out phase. FY 2019 to FY 2020 Increase/Decrease Statement: The HEGM Project was terminated in FY2018 with close-out completion in FY 2019. | | | | | 15.340 | 27.042 | - | - | - | | |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | - | 1.029 | - | - | - | | |
| Accomplishments/Planned Programs Subtotals | | | | | 17.582 | 28.071 | 5.792 | - | 5.792 | | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • K99200: Computer | 12.407 | 9.513 | 3.268 | 0.570 | 3.838 | 8.110 | 7.249 | 7.242 | 7.246 | 0.000 | 55.605 |
| Ballistics: LHMBC XM32 | | | | | | | | | | | |
| • K99300: Mortar | 46.490 | 29.149 | 13.199 | 15.975 | 29.174 | 27.274 | 8.379 | 9.699 | 11.996 | 0.000 | 162.161 |
| Fire Control System | | | | | | | | | | | |
| Remarks Other Procurement, Army (OPA) Funding | | | | | | | | | | | |
| D. Acquisition Strategy The Fire Control Modernization (FCM) strategy is using the DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives for hardware and software development and will transition into a Federal Acquisition Regulation (FAR) contract for production using Performance Specifications (P-Specs). | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|--|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) 613 / MORTAR SYSTEMS |
| <p>The High Explosive Guided Mortar (HEGM) strategy used a DoD Ordnance Technology Consortium (DOTC) transaction Agreement (OTA) initiative with multiple contractors. The Program was terminated in FY 2018 with close-out completion in FY 2019. The DOTC initiatives will be completed in FY 2019 with guided flight tests of possible solutions and a preliminary design review.</p> | | |
| <p>E. Performance Metrics N/A</p> | | |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|---|------------------------|--|-------------|---------|------------|--|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) 613 / MORTAR SYSTEMS | | | | | |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Fire Control Modernization - Project Manager Office Support | Various | Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ | 0.080 | 0.098 | Dec 2017 | - | | 0.150 | Nov 2019 | - | | 0.150 | 0.000 | 0.328 | - |
| HEGM - Project Manager Office | Various | Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ | 0.575 | 0.225 | Jan 2018 | - | | - | | - | | - | 0.000 | 0.800 | - |
| Subtotal | | | 0.655 | 0.323 | | - | | 0.150 | | - | | 0.150 | 0.000 | 1.128 | N/A |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Fire Control Modernization - Software Development | MIPR | Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | - | | - | | 4.142 | Nov 2019 | - | | 4.142 | 0.000 | 4.142 | - |
| Fire Control Modernization - Development | MIPR | DoD Ordnance Technology Consortium (DOTC) - Inertial Labs : Paeonian Springs, VA | 1.100 | 1.094 | Mar 2018 | - | | 1.000 | Mar 2020 | - | | 1.000 | 0.000 | 3.194 | - |
| HEGM System Engineering Phase 1 | MIPR | DoD Ordnance Technology Consortium (DOTC) - General Dynamics OTS : Bothell, WA | 4.413 | 0.831 | Feb 2018 | - | | - | | - | | - | 0.000 | 5.244 | 5.163 |
| HEGM System Engineering Phase 1 | MIPR | DoD Ordnance Technology | 4.413 | 0.831 | Feb 2018 | - | | - | | - | | - | 0.000 | 5.244 | 5.163 |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|--|------------------------|--|-------------|---------|------------|--|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) 613 / MORTAR SYSTEMS | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| | | Consortium (DOTC) - BAE Systems : Nashu, NH | | | | | | | | | | | | | |
| HEGM System Engineering Phase 1 | MIPR | DoD Ordnance Technology Consortium (DOTC) - Orbital ATK : Plymouth, MN | 4.413 | 2.067 | Feb 2018 | - | | - | | - | | - | 0.000 | 6.480 | 5.163 |
| HEGM System Development Phase 2 | MIPR | DoD Ordnance Technology Consortium (DOTC) - GDOTS : Bothell, WA | - | 6.235 | Jun 2018 | - | | - | | - | | - | 0.000 | 6.235 | 44.593 |
| HEGM - Fire Control | MIPR | Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | 0.115 | 0.250 | Mar 2018 | - | | - | | - | | - | 0.000 | 0.365 | - |
| XM1113 Prototype Hardware | MIPR | DoD Ordnance Technology Consortium : Various | - | - | | 19.450 | Jan 2019 | - | | - | | - | 0.000 | 19.450 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 1.029 | | - | | - | | - | 0.000 | 1.029 | - |
| Subtotal | | | 14.454 | 11.308 | | 20.479 | | 5.142 | | - | | 5.142 | 0.000 | 51.383 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Fire Control Modernization - ARDEC Engineering Support | MIPR | Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | 0.743 | 1.050 | Dec 2017 | - | | 0.500 | Dec 2019 | - | | 0.500 | 0.000 | 2.293 | - |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 - ARDEC Engineering Support | MIPR | Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | 1.440 | 3.218 | Dec 2017 | - | | - | | - | | - | 0.000 | 4.658 | - |
| XM1113 Software Updates | MIPR | Armament Research, Development, and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | - | | 1.750 | Feb 2019 | - | | - | | - | 0.000 | 1.750 | - |
| Project Management | MIPR | Armament Research, Development, and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | - | | 0.742 | Mar 2019 | - | | - | | - | 0.000 | 0.742 | - |
| Subtotal | | | 2.183 | 4.268 | | 2.492 | | 0.500 | | - | | 0.500 | 0.000 | 9.443 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | 0.350 | 1.683 | Apr 2018 | - | | - | | - | | - | 0.000 | 2.033 | - |
| XM1113 Lethality Testing | MIPR | Naval Surface Warfare Center (NSWC) : Dahlgren, VA | - | - | | 1.500 | Mar 2019 | - | | - | | - | 0.000 | 1.500 | - |
| XM1113 Urgent Materiel Release (UMR) Qualification Testing | MIPR | Army Test and Evaluation Command (ATEC) | - | - | | 3.600 | Mar 2019 | - | | - | | - | 0.000 | 3.600 | - |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 Proving Ground (YPG) : Yuma, AZ | | | | | | | | | | | | | |
| Subtotal | | | 0.350 | 1.683 | | 5.100 | | - | | - | | - | 0.000 | 7.133 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | 17.642 | 17.582 | | 28.071 | | 5.792 | | - | | 5.792 | 0.000 | 69.087 | N/A |
| Remarks FY 2019 funding from Project 613, MORTAR SYSTEMS, was realigned to Project EU6, 155mm HE Rocket Assist Project Extended Range. Both Projects are within the 0604802A Program Element. This funding will be utilized to complete XM1113 lethality testing, firing tables software updates, development of fuze integration efforts, and development of prototype hardware for qualification in support of the Urgent Materiel Release of 2,000 projectiles in FY 2021 to support the Army's modernization priorities in support of the National Defense Strategy. | | | | | | | | | | | | | | | |

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army

Date: March 2019

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 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| Fire Control Modernization | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM- Engineering & Manufacturing Development (EMD) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EMD Preliminary & Detailed Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM-Software Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Software Dev | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM- Preliminary Design (SYS Eng Phase 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYS Eng Phase 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM- Preliminary Design Review (PDR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PDR | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM- EMD Detailed Design (Sys Dev Phase 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sys Dev Phase 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FCM- Critical Design Review (CDR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CDR | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HEGM | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HEGM - Engineering & Manufacturing Development (EMD) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EMD | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HEGM - Preliminary Design (SYS Eng Phase 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Preliminary Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HEGM - Preliminary Design Review (PDR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PDR | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note

Footnote FY18 Carryover funding used to continue WULF efforts due to cut in FY19 funding

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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 |
| Fire Control Modernization | 1 | 2020 | 1 | 2020 |
| FCM- Engineering & Manufacturing Development (EMD) | 1 | 2018 | 4 | 2021 |
| FCM-Software Development | 1 | 2020 | 4 | 2021 |
| FCM- Preliminary Design (SYS Eng Phase 1) | 1 | 2020 | 1 | 2021 |
| FCM- Preliminary Design Review (PDR) | 1 | 2021 | 1 | 2021 |
| FCM- EMD Detailed Design (Sys Dev Phase 2) | 2 | 2021 | 4 | 2021 |
| FCM- Critical Design Review (CDR) | 4 | 2021 | 4 | 2021 |
| HEGM | 1 | 2018 | 1 | 2018 |
| HEGM - Engineering & Manufacturing Development (EMD) | 1 | 2018 | 4 | 2019 |
| HEGM - Preliminary Design (SYS Eng Phase 1) | 3 | 2017 | 4 | 2018 |
| HEGM - Preliminary Design Review (PDR) | 4 | 2018 | 4 | 2018 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|------------|
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EC4: Non-Standard Simulator Munitions | - | 0.863 | 3.146 | 2.644 | - | 2.644 | 2.121 | 2.159 | 0.000 | 0.000 | 0.000 | 10.933 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

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 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 (HiOBE) 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Standardize Special Use Ammunition | 0.863 | 3.045 | 2.644 | - | 2.644 |
| Description: Standardize non-standard pyrotechnic battlefield effects currently used by Combat Training Centers (CTCs) . | | | | | |
| FY 2019 Plans: This project will provide documentation support for Milestone C, Type Classification and Material Release. LA45/A47 adoption memo to transition TDP from the Marines to conduct type Classification/Material Release (TC/MR). Black and Yellow smoke Type Classification/ Full Material Release (TC/FMR). Evaluate the following COTS items:, Macro/Micro, Rocket Propelled Grenade (RPG) on a wire, High Order Blast Effect (HiOBE) and Tracer-Fire back. | | | | | |
| FY 2020 Base Plans: | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| <p>This project will support the Engineering Manufacturing and Development (EMD) phases for LA45/47, Black and Yellow smoke to include Energetic Material Qualification (EMQ) testing. Evaluate the following COTs items for environmental and safety considerations: Macro/Micro, RPG on a wire, HiOBE and Tracer-Fire back.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: Program Requirements have been further defined resulting in more concise funding requirements.</p> <p>Title: FY 2019 SBIR / STTR Transfer</p> <p>FY 2019 Plans: FY 2019 SBIR / STTR Transfer</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer</p> | | | | | |
| Accomplishments/Planned Programs Subtotals | 0.863 | 3.146 | 2.644 | - | 2.644 |

| | | | | | | | | | | | |
|--|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • E88404: <i>SIMULATORS, Non-Standard, Special Effects, f/CTCs</i> | - | 1.652 | 0.000 | 1.699 | 1.699 | 1.750 | 0.283 | 0.289 | 0.289 | 0.000 | 5.962 |
| Remarks | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| <p>The Acquisition strategy is for a family of special use ammunition that will be developed in incremental phases as funding and requirements are approved. Milestone Decision Document (MDD) Approval 4th Qtr FY 2018. 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 US Army Training and Doctrine Command (TRADOC).</p> | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | MIPR | PM Close Combat Systems : PICATINNY ARSENAL | 0.289 | - | | 0.061 | Feb 2019 | 0.031 | Feb 2020 | - | | 0.031 | 0.000 | 0.381 | - |
| Subtotal | | | 0.289 | - | | 0.061 | | 0.031 | | - | | 0.031 | 0.000 | 0.381 | N/A |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Product Development | C/FFP | ARDEC : PICATINNY ARSENAL | 1.134 | - | | 1.384 | May 2019 | 0.800 | May 2020 | - | | 0.800 | 0.000 | 3.318 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.101 | | - | | - | | - | 0.000 | 0.101 | - |
| Subtotal | | | 1.134 | - | | 1.485 | | 0.800 | | - | | 0.800 | 0.000 | 3.419 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Engineering Support | MIPR | ARDEC : Picatinny Arsenal | 0.802 | 0.863 | Feb 2018 | 0.600 | Feb 2019 | 1.163 | Feb 2020 | - | | 1.163 | 0.000 | 3.428 | - |
| Subtotal | | | 0.802 | 0.863 | | 0.600 | | 1.163 | | - | | 1.163 | 0.000 | 3.428 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Test and Evaluation | MIPR | ARDEC : Picatinny | 0.541 | - | | 1.000 | Jun 2019 | 0.650 | Jun 2020 | - | | 0.650 | 0.000 | 2.191 | - |
| Subtotal | | | 0.541 | - | | 1.000 | | 0.650 | | - | | 0.650 | 0.000 | 2.191 | N/A |

UNCLASSIFIED

| | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|---|---------|--|---------|--|---|------------------|----------------|--|------------------|---------------------|---------------|--------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | Date: March 2019 | | | | | | |
| 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 | | | | | | | |
| | | | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | | | 2.766 | 0.863 | | 3.146 | | 2.644 | | - | | 2.644 | 0.000 | 9.419 | N/A |

Remarks

UNCLASSIFIED

| | | | | | |
|--|--|--|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | | Project (Number/Name) EC4 / <i>Non-Standard Simulator Munitions</i> | |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| Materiel Development Decision Approval Special Use Ammunition Pyrotechnics | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MDD | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LA 45/47 Transition TDP from Marines | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Energetic Material Qualification Testing Black and Yellow Smoke | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MS C for LA 45/47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MS C for Black & Yellow Smokes | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluate RPG on a wire, HIOBE, Macro/Micro Pyrotechnics and Tracer-Fireback COTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EC4 / <i>Non-Standard Simulator Munitions</i> | |

Schedule Details

| Events | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| Materiel Development Decision Approval Special Use Ammunition Pyrotechnics | 1 | 2018 | 2 | 2019 |
| LA 45/47 Transition TDP from Marines | 2 | 2018 | 3 | 2019 |
| Energetic Material Qualification Testing Black and Yellow Smoke | 1 | 2020 | 2 | 2021 |
| MS C for LA 45/47 | 2 | 2021 | 2 | 2021 |
| MS C for Black & Yellow Smokes | 2 | 2021 | 2 | 2021 |
| Evaluate RPG on a wire, HIOBE, Macro/Micro Pyrotechnics and Tracer-Fireback COTS | 3 | 2019 | 4 | 2021 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| ED7: Advanced Multipurpose (AMP) Cartridge | - | 30.390 | 21.802 | 14.100 | - | 14.100 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 66.292 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| Note The project is not a new start. | | | | | | | | | | | | |
| 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. AMP has three modes of operation including point detonate, point detonate delay, and airburst. AMP is the materiel solution for breaching double reinforced concrete walls and defeating Anti Tank Guided Missile (ATGM) teams from 50m to 2000m threshold and 50m to 4500m objective, 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. In FY 2020 the program will transition into Procurement. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Engineering and Manufacturing Development (EMD) Phase 2 | | | | | | | | 29.890 | 20.064 | 14.100 | - | 14.100 |
| 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 2019 Plans: Continue engineering efforts to further mature the design and conduct testing to verify performance expectations will be met prior to the Critical Design Review (CDR). Begin manufacture of mature long lead components required for the DT&E build and delivery. Initiate efforts in preparation for CDR. | | | | | | | | | | | | |
| FY 2020 Base Plans: Engineering Manufacturing Development Phase 2 will continue with the completion of the Developmental Test & Evaluation (DT&E) build, initiation and completion of DT&E which will include Limited User and Live Fire Testing, | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | |
|--|---|---|------------------|-----------------|----------------|------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 | | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Initial Operation Test Planning, preparation for transition to Low Rate Initial Production at Milestone C, and Milestone C approval. | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: AMP Program transitioning from RDTE to Procurement in FY 2020 | | | | | | |
| Title: Evaluation for Future Combat Platforms Description: Evaluation of the scalability for future combat platforms. | | 0.500 | 0.250 | - | - | - |
| FY 2019 Plans: Efforts will continue on the evaluation of the scalability for future combat platforms | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: AMP Program transitioning from RDTE to Procurement in FY 2020 | | | | | | |
| Title: Training Round Demonstration Description: Demonstrate feasibility of a training round for AMP | | - | 0.500 | - | - | - |
| FY 2019 Plans: Feasibility of a training round for AMP will be demonstrated. | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: AMP Program transitioning from RDTE to Procurement in FY 2020 | | | | | | |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer | | - | 0.988 | - | - | - |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | | |
| Accomplishments/Planned Programs Subtotals | | 30.390 | 21.802 | 14.100 | - | 14.100 |

UNCLASSIFIED

| | | | | | | | | | | | |
|--|----------------|----------------|----------------|---|----------------|----------------|----------------|---|----------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | |
| 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 | | | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| | | | <u>FY 2020</u> | <u>FY 2020</u> | <u>FY 2020</u> | | | | | <u>Cost To</u> | |
| <u>Line Item</u> | <u>FY 2018</u> | <u>FY 2019</u> | <u>Base</u> | <u>OCO</u> | <u>Total</u> | <u>FY 2021</u> | <u>FY 2022</u> | <u>FY 2023</u> | <u>FY 2024</u> | <u>Complete</u> | <u>Total Cost</u> |
| • E88105: CTG, 120MM TANK, HEMP-T, XM1147 | - | 16.398 | 0.000 | 15.002 | 15.002 | 39.029 | 46.941 | 46.949 | 44.507 | 0.000 | 208.826 |
| Remarks | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| The AMP Program achieved Milestone B and entered EMD in FY 2015. EMD consists of two phases; Phase 1 awarded two contracts in FY 2015 to competitively prototype. A cartridge demonstration test was conducted and was used to support downselect to a single contractor for EMD Phase 2, which will lead to Milestone C in 2020 followed by two Low Rate Initial Productions in FY 2020 and FY 2021 and one optional year of full procurement in FY 2023. Explore options to increase future competition and facilitate effective training. | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

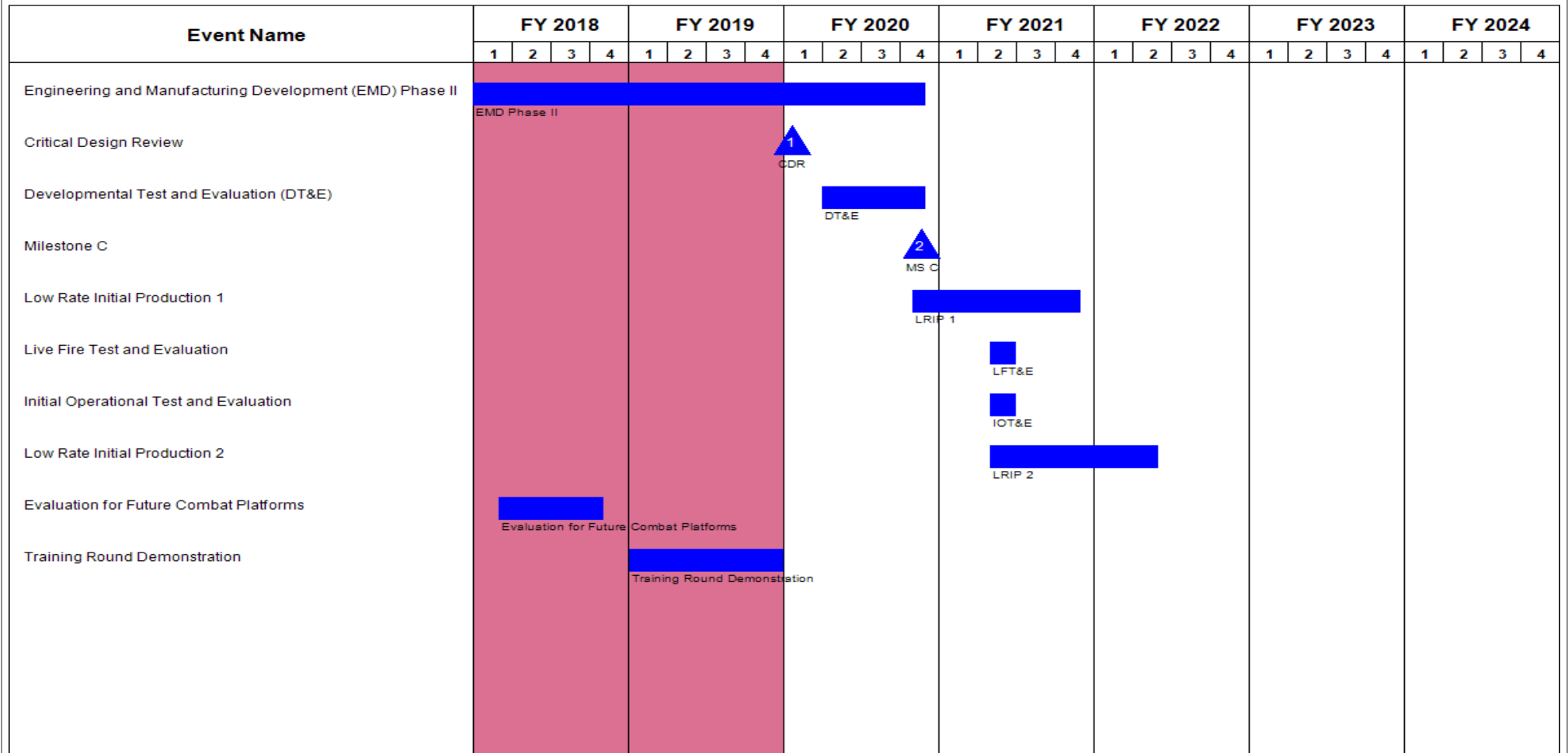
| | | | | | | | | | | | | | | | |
|--|------------------------------|-----------------------------------|----------------|---------|---------------|---|---------------|-----------------|---------------|---|---------------|------------------|---------------------|---------------|--------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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) | Various | Picatinny : NJ | 3.497 | 1.550 | Oct 2017 | 0.624 | Dec 2018 | 0.426 | Dec 2019 | - | | 0.426 | Continuing | Continuing | Continuing |
| Northrop Grumman Innovation Systems (NGIS) | C/CPIF | NGIS : Plymouth, MN | 54.804 | 22.188 | Nov 2017 | 5.759 | Dec 2018 | 3.365 | Nov 2019 | - | | 3.365 | Continuing | Continuing | Continuing |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.988 | | - | | - | | - | 0.000 | 0.988 | - |
| Subtotal | | | 58.301 | 23.738 | | 7.371 | | 3.791 | | - | | 3.791 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | 6.361 | 3.582 | Jan 2018 | 2.565 | Feb 2019 | 1.565 | Nov 2019 | - | | 1.565 | Continuing | Continuing | Continuing |
| Subtotal | | | 6.361 | 3.582 | | 2.565 | | 1.565 | | - | | 1.565 | Continuing | Continuing | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | 3.923 | 2.570 | Aug 2018 | 9.931 | Jan 2019 | 7.604 | Jan 2020 | - | | 7.604 | Continuing | Continuing | Continuing |
| Aberdeen Test Center | MIPR | Aberdeen Proving Ground : MD | 3.756 | 0.500 | Aug 2018 | 1.935 | Jan 2019 | 1.140 | Jan 2020 | - | | 1.140 | Continuing | Continuing | Continuing |
| Subtotal | | | 7.679 | 3.070 | | 11.866 | | 8.744 | | - | | 8.744 | Continuing | Continuing | N/A |

UNCLASSIFIED

| | | | | | | | | | | | | | |
|---|--------------------|----------------|--|----------------|---|---------------------|--|--------------------|--|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | Date: March 2019 | | | |
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | 72.341 | 30.390 | | 21.802 | | 14.100 | | - | | 14.100 | Continuing | Continuing | N/A |
| Remarks | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 | |



UNCLASSIFIED

| | | | |
|---|--|--|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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> | |

Schedule Details

| Events | Start | | End | |
|--|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| Engineering and Manufacturing Development (EMD) Phase I | 4 | 2015 | 1 | 2017 |
| Engineering and Manufacturing Development (EMD) Phase II | 2 | 2017 | 4 | 2020 |
| Critical Design Review | 1 | 2020 | 1 | 2020 |
| Developmental Test and Evaluation (DT&E) | 2 | 2020 | 4 | 2020 |
| Milestone C | 4 | 2020 | 4 | 2020 |
| Low Rate Initial Production 1 | 4 | 2020 | 4 | 2021 |
| Live Fire Test and Evaluation | 2 | 2021 | 2 | 2021 |
| Initial Operational Test and Evaluation | 2 | 2021 | 2 | 2021 |
| Low Rate Initial Production 2 | 2 | 2021 | 2 | 2022 |
| Evaluation for Future Combat Platforms | 1 | 2018 | 4 | 2018 |
| Training Round Demonstration | 1 | 2019 | 4 | 2019 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EL9: Ammunitions Logistics Prototyping | - | 0.684 | 2.014 | 2.329 | - | 2.329 | 1.703 | 0.705 | 1.000 | 1.020 | 0.000 | 9.455 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| A. Mission Description and Budget Item Justification | | | | | | | | | | | | |
| This project supports the future force by improving the distribution, management, reliability and survivability of ammunition through the advanced development, integration, and demonstration of logistics system enablers. These enablers will improve the efficiency and effectiveness of ammunition operations, to include retrograde, while reducing the logistics footprint on the battlefield. Technology areas addressed include handling, distribution, and management (strategic and tactical), prognostics, diagnostics, and asset visibility, explosives safety, and adaptive and environmentally friendly packaging and palletization. The efficient deployment and sustainment of reliable ammunition is vital to success on the battlefield. This project enhances the operational effectiveness of the ammunition logistics system to ensure the distribution of reliable ammunition to the warfighter. FY 2020 funding will be used to continue integrating the munitions health monitoring system with additional ammunition items and conduct qualification tests and continue to integrate passive time/temperature exposure sensors with additional ammunition items and conduct qualification testing. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Munitions Survivability and Logistics Enablers | | | | | | | | 0.684 | 1.949 | 2.329 | - | 2.329 |
| Description: This program will develop ammunition logistics systems that improve munitions survivability and logistics | | | | | | | | | | | | |
| FY 2019 Plans: Integrate the munitions health monitoring system with additional developmental ammunition items and conduct qualification tests. Continue to integrate passive time/temperature exposure sensor with developmental ammunition items and conduct qualification testing. | | | | | | | | | | | | |
| FY 2020 Base Plans: Continue to integrate the munitions health monitoring system with additional ammunition items and conduct qualification tests. Continue to integrate passive time/temperature exposure sensor with ammunition items and conduct qualification testing. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 funding is slightly higher than FY 2019 due to anticipated increase in labor costs. | | | | | | | | | | | | |
| Title: FY 2019 SBIR/STTR Transfer | | | | | | | | - | 0.065 | - | - | - |

UNCLASSIFIED

| | | | | | | |
|---|--|---|----------------|---|------------------------|--------------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | | |
| 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 | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | |
| | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Description: FY 2019 SBIR/STTR Transfer | | | | | | |
| FY 2019 Plans: FY 2019 SBIR/STTR Transfer | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR/STTR Transfer | | | | | | |
| Accomplishments/Planned Programs Subtotals | | 0.684 | 2.014 | 2.329 | - | 2.329 |
| C. Other Program Funding Summary (\$ in Millions) N/A | | | | | | |
| Remarks | | | | | | |
| D. Acquisition Strategy The acquisition strategy is to develop and test the Munitions Health Monitoring items and conduct a Technology Readiness Assessment (TRA) to ensure readiness for insertion into families of end items. | | | | | | |
| E. Performance Metrics N/A | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|------------------------|-------------------------------------|-------------|---------|------------|--|------------|--------------|------------|--|------------|------------------|------------------|------------|--------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Contractor | C/FFP | Karagozian & Case : Glendale, CA | - | 0.534 | Aug 2018 | 0.750 | Feb 2019 | 1.629 | Dec 2019 | - | | 1.629 | 0.000 | 2.913 | - |
| Subtotal | | | - | 0.534 | | 0.750 | | 1.629 | | - | | 1.629 | 0.000 | 2.913 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| ARDEC | MIPR | Picatinny Arsenal : NJ | 0.102 | 0.150 | Jun 2018 | 0.614 | Dec 2018 | 0.400 | Dec 2019 | - | | 0.400 | 0.000 | 1.266 | - |
| Subtotal | | | 0.102 | 0.150 | | 0.614 | | 0.400 | | - | | 0.400 | 0.000 | 1.266 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Operational Testing - RRAPDS | RO | Yuma Prooving Ground : Yuma Arizona | - | - | | 0.650 | Mar 2019 | 0.300 | Mar 2020 | - | | 0.300 | 0.000 | 0.950 | - |
| Subtotal | | | - | - | | 0.650 | | 0.300 | | - | | 0.300 | 0.000 | 0.950 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | 0.102 | 0.684 | | 2.014 | | 2.329 | | - | | 2.329 | 0.000 | 5.129 | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 | |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| System Development - Munitions Health Monitoring System | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Development - Low Cost Thermal Indicator | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Development - Plastic Cylindrical Container | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Development - Plastic Rectangular Container | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System Development - Next Generation Temperature/Humidity Sensor | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|--|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EL9 / <i>Ammunitions Logistics Prototyping</i> | |

Schedule Details

| Events | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| System Development - Munitions Health Monitoring System | 2 | 2018 | 4 | 2023 |
| System Development - Low Cost Thermal Indicator | 3 | 2017 | 2 | 2023 |
| System Development - Plastic Cylindrical Container | 1 | 2021 | 4 | 2022 |
| System Development - Plastic Rectangular Container | 1 | 2021 | 4 | 2023 |
| System Development - Next Generation Temperature/Humidity Sensor | 2 | 2019 | 4 | 2023 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EP2 / Shoulder-Launched Munitions | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EP2: Shoulder-Launched Munitions | - | 3.000 | 0.000 | 4.100 | - | 4.100 | 10.400 | 0.000 | 0.000 | 0.000 | 0.000 | 17.500 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

The Individual Assault Muniton effort is a new start in FY 2020.

A. Mission Description and Budget Item Justification

Project EP2, Shoulder-Launched Munitions: This project previously funded the one-time acceleration of the Tandem Warhead type classification and completion of development and testing for use in the Shoulder Launched AT-4 Single-use 84mm Anti-Tank Weapon. The AT-4 Tandem Warhead provides a single shot solution with increased lethality for infantry crew formations against anti-armor and to defeat hardened structures. The AT-4 effort was part of the Secretary of Defense's Close Combat Lethality task force.

The Individual Assault Muniton (IAM) will be a lightweight Shoulder Launched Muniton (SLM) capability for combat units at the individual Soldier level. As an improvement over existing Shoulder Launched Munitions, the 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 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 solution will combine the capability of multiple existing shoulder-launched munitions which will allow for reduced Soldier load, training complexity and logistics burden for Light Infantry, Combat Engineers and Special Operations Forces. FY 2020 funding will provide the Army the opportunity to evaluate various prototype munitions to achieve emerging increased capability as an Individual Assault Muniton. The Individual Assault Muniton Capabilities Development Document (CDD) was approved on 11 March 2016.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Individual Assault Muniton (IAM) | - | - | 4.100 | - | 4.100 |
| FY 2020 Base Plans: FY 2020 funding support the Shoulder Launched Munitions team to evaluate and develop system technology advancements to ensure the soldier has increased capabilities to engage targets at close ranges within enclosures. | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: This is a new start in FY 2020. | | | | | |
| Title: Shoulder Launched AT-4 Single Use 84mm Anti-tank Weapon | 3.000 | - | - | - | - |

UNCLASSIFIED

| | | | | | |
|--|--|--|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | | Project (Number/Name) EP2 / <i>Shoulder-Launched Munitions</i> | |

| | | | | | |
|---|----------------|----------------|-------------------------|------------------------|--------------------------|
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | |
| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Accomplishments/Planned Programs Subtotals | 3.000 | - | 4.100 | - | 4.100 |

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

Remarks

D. Acquisition Strategy
The Individual Assault Munition (IAM) acquisition strategy is to conduct market research on draft Capability Production Document (CPD) requirements for developing product improvements such as making the system lighter with more anti armor protection capabilities. These improvements will then be incorporated into the technical data package for future procurements.

E. Performance Metrics
N/A

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | Project (Number/Name) EP2 / Shoulder-Launched Munitions | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Dept of Defense Ordnance Technology Consortium (DOTC) | MIPR | DOTC : Picatinny Arsenal, NJ | - | 3.000 | | - | | 3.400 | Mar 2020 | - | | 3.400 | 0.000 | 6.400 | - |
| Subtotal | | | - | 3.000 | | - | | 3.400 | | - | | 3.400 | 0.000 | 6.400 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Engineering in Support of Items in Production (ESIP) | MIPR | ARDEC : Picatinny Arsenal, NJ | - | - | | - | | 0.700 | Dec 2019 | - | | 0.700 | 0.000 | 0.700 | - |
| Subtotal | | | - | - | | - | | 0.700 | | - | | 0.700 | 0.000 | 0.700 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | 3.000 | | 0.000 | | 4.100 | | - | | 4.100 | 0.000 | 7.100 | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) EP2 / Shoulder-Launched Munitions | |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| ENGINEERING IN SUPPORT OF ITEMS IN PRODUCTION (ESIP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DOD DEFENSE ORDNANCE TECHNOLOGY CONSORTIUM AWARD 1 & 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROTOTYPE HARDWARE BUILD | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GOVERNMENT RANGE TESTING | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CRITICAL DESIGN REVIEW | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HARDWARE BUILD | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TEST EVALUATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MS C / TYPE CLASSIFICATION DOCUMENTATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MS C / TYPE CLASSIFICATION DECISION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|--|---|--|------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) EP2 / Shoulder-Launched Munitions | |

Schedule Details

| Events | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| ENGINEERING IN SUPPORT OF ITEMS IN PRODUCTION (ESIP) | 1 | 2021 | 1 | 2022 |
| DOD DEFENSE ORDNANCE TECHNOLOGY CONSORTIUM AWARD 1 & 2 | 2 | 2020 | 2 | 2020 |
| PROTOTYPE HARDWARE BUILD | 2 | 2020 | 3 | 2020 |
| GOVERNMENT RANGE TESTING | 3 | 2020 | 4 | 2020 |
| CRITICAL DESIGN REVIEW | 3 | 2021 | 3 | 2021 |
| HARDWARE BUILD | 3 | 2021 | 1 | 2022 |
| TEST EVALUATION | 2 | 2022 | 3 | 2022 |
| MS C / TYPE CLASSIFICATION DOCUMENTATION | 3 | 2022 | 4 | 2022 |
| MS C / TYPE CLASSIFICATION DECISION | 4 | 2022 | 4 | 2022 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EP3: Reduced Range Ammunition - Small Caliber | - | 0.000 | 2.470 | 8.376 | - | 8.376 | 15.000 | 15.250 | 13.200 | 0.000 | 0.000 | 54.296 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

The small caliber Reduced Range technology applies to multiple calibers. The effort under Budget Activity 04, Program Element (PE) 0603639A, Project EL7, Reduced Range Ammunition (RRA), transitions in FY 2019 to Budget Activity 05, PE 0604802A, Project EP3, Reduced Range Ammunition - Small Caliber. PE 0604802A, Project EP3, RRA funding continues the development work of 7.62mm and supports Engineering and Manufacturing Development (EMD) in FY 2019 and the .50 Caliber EMD effort beginning in FY 2020. RRA technologies will be assessed for adaptability to the new Next Generation Squad Weapons (NGSW) ammunition; which will be further developed and fielded under a separate funding line in the future.

A. Mission Description and Budget Item Justification

The small caliber Reduced Range Ammunition (RRA) Project is a critical technology development in response to the 7.62mm and .50 caliber Capabilities Development Documents (CDD). The overall objective of RRA is to provide training ammunition suitable for use on military installations with Surface Danger Zone (SDZ) restrictions. The relatively long maximum range of the 7.62mm and .50 caliber service ammunition poses challenges on training ranges in range restricted areas. RRA will mitigate a training gap on installations by providing a materiel solution that meets training needs while shortening and condensing the SDZ. This will allow soldiers to train with 7.62mm and .50 caliber weapons on restricted ranges. The RRA cartridge design will be compatible with all Army 7.62mm and .50 caliber weapons, but specifically optimized to work in the M240 and M2 Machine Guns. FY 2020 funding supports continuing Engineering and Manufacturing Development (EMD) efforts and performing design/verification testing on the 7.62mm variant. FY 2020 funds also support Milestone (MS) B activities to include Preliminary Design Review (PDR) and Engineering and Manufacturing Development (EMD) Contract Award for the .50 caliber variant. FY 2020 funds also supports RRA concept development/evaluation for the Next Generation Squad Weapon (NGSW) systems.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Engineering and Manufacturing Development 7.62mm | - | 2.391 | 3.500 | - | 3.500 |
| Description: Engineering and Manufacturing Development (EMD) Activities for 7.62mm Reduced Range Ammunition. | | | | | |
| FY 2019 Plans: FY 2019 activities will include various Milestone B activities for 7.62mm to include Industry Day, release Request for Proposal (RFP), perform a System Functional Review, conduct bid sample testing in support of contract | | | | | |

UNCLASSIFIED

| | | | | | | |
|--|--|---|------------------|--------------|-------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| award for Engineering and Manufacturing Development (EMD), and conduct a Preliminary Design Review (PDR). FY 2020 Base Plans: Continue EMD efforts and perform 7.62mm RRA design review and qualification testing. FY 2019 to FY 2020 Increase/Decrease Statement: Planned increase for 7.62mm EMD contract efforts. | | | | | | |
| Title: Engineering and Manufacturing Development .50 Caliber Description: Engineering and Manufacturing Development (EMD) Activities for .50 Cal Reduced Range Ammunition. FY 2020 Base Plans: Continue EMD efforts and perform .50 Cal RRA Preliminary Design Review (PDR) and qualification testing. FY 2019 to FY 2020 Increase/Decrease Statement: Planned EMD contract award for the .50 Cal RRA effort. | | - | - | 4.676 | - | 4.676 |
| Title: NGSW Reduced Range Technology Evaluation Description: Concept development/evaluation of RRA ammunition for the Next Generation Squad Weapons. FY 2020 Base Plans: Explore/evaluate RRA ammunition concepts for the NGSW. FY 2019 to FY 2020 Increase/Decrease Statement: Begin exploring RRA ammunition solutions for the new NGSW. | | - | - | 0.200 | - | 0.200 |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | - | 0.079 | - | - | - |
| Accomplishments/Planned Programs Subtotals | | - | 2.470 | 8.376 | - | 8.376 |

UNCLASSIFIED

| | | | | | | | | | | | |
|---|-----------------------|-----------------------|-----------------------|---|-----------------------|-----------------------|-----------------------|--|-----------------------|-------------------------|--------------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | |
| Appropriation/Budget Activity 2040 / 5 | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | | | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| | | | <u>FY 2020</u> | <u>FY 2020</u> | <u>FY 2020</u> | | | | | <u>Cost To</u> | |
| <u>Line Item</u> | <u>FY 2018</u> | <u>FY 2019</u> | <u>Base</u> | <u>OCO</u> | <u>Total</u> | <u>FY 2021</u> | <u>FY 2022</u> | <u>FY 2023</u> | <u>FY 2024</u> | <u>Complete</u> | <u>Total Cost</u> |
| • EL7: Reduced Range Ammunition | 3.429 | 7.609 | 0.000 | - | 0.000 | - | - | - | - | 0.000 | 11.038 |
| Remarks | | | | | | | | | | | |
| Budget Activity 05, Program Element 0604802A, Project EP3, Reduced Range Ammunition transitioned from Budget Activity 04, PE 0603639A, Project EL7, RRA in FY 2019 for the 7.62mm variant. The .50 Caliber variant transitions in FY 2020. | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| After 7.62mm Milestone (MS) B in FY 2019, the Government intends to award an Engineering and Manufacturing Development (EMD) contracts. The Government will then award a competitive contract for 7.62mm Pre-Production Qualification Testing (PPQT) hardware in FY 2020 and down-select to a single contractor to complete EMD. The .50 Caliber effort follows a similar strategy. After .50 Caliber Reduced Range Ammunition (RRA) MS B in FY 2020, the Government intends to award a competitive EMD contract. | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Development Contract 7.62mm | Option/CPFF | OLIN Winchester Corporation : Oxford, MS | - | - | | 0.855 | Jan 2019 | 1.550 | Jan 2020 | - | | 1.550 | Continuing | Continuing | Continuing |
| Development Contract .50 Cal | C/CPFF | To be Determined : To be Determined | - | - | | - | | 2.500 | Jan 2020 | - | | 2.500 | Continuing | Continuing | Continuing |
| NGSW RRA Concept Evaluation | MIPR | Armament Research Development and Engineering Center (ARDEC) : New Jersey | - | - | | - | | 0.200 | Oct 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| Prototype Development | Option/CPAF | Booz Allen Hamilton : Dover, NJ | - | - | | 0.103 | Nov 2018 | - | | - | | - | 0.000 | 0.103 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.079 | | - | | - | | - | 0.000 | 0.079 | - |
| Subtotal | | | - | - | | 1.037 | | 4.250 | | - | | 4.250 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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) 7.62mm | MIPR | Picatinny Arsenal : New Jersey | - | - | | 0.950 | Oct 2018 | 1.250 | Oct 2019 | - | | 1.250 | Continuing | Continuing | Continuing |
| Armament Research Development and Engineering Center (ARDEC) .50 Cal | MIPR | Picatinny Arsenal : New Jersey | - | - | | - | | 1.750 | Oct 2019 | - | | 1.750 | Continuing | Continuing | Continuing |
| Subtotal | | | - | - | | 0.950 | | 3.000 | | - | | 3.000 | Continuing | Continuing | N/A |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--|-------------------|----------------------|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | | | | | |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Engineering Tests 7.62mm | MIPR | U.S. Army Test Center : Aberdeen, Maryland | - | - | | 0.483 | Oct 2018 | 0.500 | Oct 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| Engineering Tests .50 Cal | MIPR | Aberdeen Test Center : Aberdeen, Maryland | - | - | | - | | 0.626 | Oct 2019 | - | | 0.626 | Continuing | Continuing | Continuing |
| Subtotal | | | - | - | | 0.483 | | 1.126 | | - | | 1.126 | Continuing | Continuing | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | - | | 2.470 | | 8.376 | | - | | 8.376 | Continuing | Continuing | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

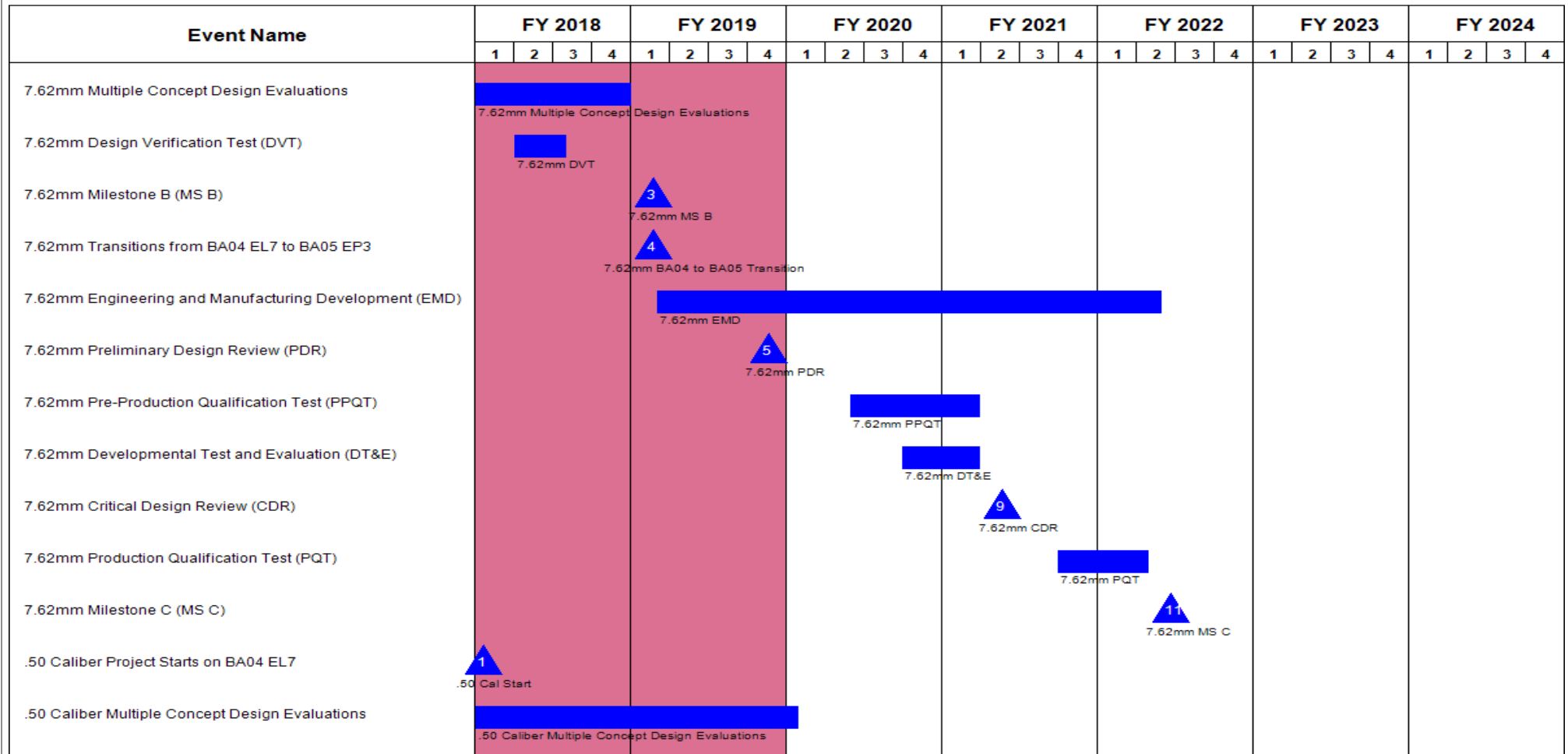
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army

Date: March 2019

Appropriation/Budget Activity
2040 / 5

R-1 Program Element (Number/Name)
PE 0604802A / Weapons and Munitions -
Eng Dev

Project (Number/Name)
EP3 / Reduced Range Ammunition - Small
Caliber



UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|--|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|---|------------------|---|---|---|---------|---|---|---|--------------------------------------|---|---|---|-------------------|---|---|---|-------------------|---|---|---|--------------------|---|---|---|---------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| .50 Caliber Materiel Development Decision (MDD) | 2 .50 Cal MDD | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .50 Caliber Design Verification Test (DVT) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .50 Caliber Milestone B (MS B) | | | | | | | | | 6 .50 Cal MS B | | | | | | | | | | | | | | | | | | | |
| .50 Caliber Transitions from BA04 EL7 to BA05 EP3 | | | | | | | | | 7 .50 Cal BA04 to BA05 Transition | | | | | | | | | | | | | | | | | | | |
| .50 Caliber Engineering and Manufacturing Development (EMD) | | | | | | | | | 8 .50 Cal EMD | | | | 9 .50 Cal EMD | | | | 10 .50 Cal EMD | | | | | | | | | | | |
| .50 Caliber Preliminary Design Review (PDR) | | | | | | | | | 8 .50 Cal PDR | | | | | | | | | | | | | | | | | | | |
| .50 Caliber Pre-Production Qualification Test (PPQT) | | | | | | | | | 9 .50 Cal PPQT | | | | | | | | | | | | | | | | | | | |
| .50 Caliber Critical Design Review (CDR) | | | | | | | | | | | | | 10 .50 Cal CDR | | | | | | | | | | | | | | | |
| .50 Caliber Production Qualification Test (PQT) | | | | | | | | | | | | | | | | | 11 .50 Cal PQT | | | | | | | | | | | |
| .50 Caliber Milestone C (MS C) | | | | | | | | | | | | | | | | | | | | | 12 .50 Cal MS C | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EP3 / <i>Reduced Range Ammunition - Small Caliber</i> | |

Schedule Details

| Events | Start | | End | |
|---|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| 7.62mm Multiple Concept Design Evaluations | 1 | 2017 | 4 | 2018 |
| 7.62mm Design Verification Test (DVT) | 2 | 2018 | 3 | 2018 |
| 7.62mm Milestone B (MS B) | 1 | 2019 | 1 | 2019 |
| 7.62mm Transitions from BA04 EL7 to BA05 EP3 | 1 | 2019 | 1 | 2019 |
| 7.62mm Engineering and Manufacturing Development (EMD) | 1 | 2019 | 2 | 2022 |
| 7.62mm Preliminary Design Review (PDR) | 4 | 2019 | 4 | 2019 |
| 7.62mm Pre-Production Qualification Test (PPQT) | 2 | 2020 | 1 | 2021 |
| 7.62mm Developmental Test and Evaluation (DT&E) | 4 | 2020 | 1 | 2021 |
| 7.62mm Critical Design Review (CDR) | 2 | 2021 | 2 | 2021 |
| 7.62mm Production Qualification Test (PQT) | 4 | 2021 | 2 | 2022 |
| 7.62mm Milestone C (MS C) | 2 | 2022 | 2 | 2022 |
| .50 Caliber Project Starts on BA04 EL7 | 1 | 2018 | 1 | 2018 |
| .50 Caliber Multiple Concept Design Evaluations | 1 | 2018 | 1 | 2020 |
| .50 Caliber Materiel Development Decision (MDD) | 2 | 2018 | 2 | 2018 |
| .50 Caliber Design Verification Test (DVT) | 2 | 2019 | 3 | 2019 |
| .50 Caliber Milestone B (MS B) | 1 | 2020 | 1 | 2020 |
| .50 Caliber Transitions from BA04 EL7 to BA05 EP3 | 1 | 2020 | 1 | 2020 |
| .50 Caliber Engineering and Manufacturing Development (EMD) | 1 | 2020 | 2 | 2023 |
| .50 Caliber Preliminary Design Review (PDR) | 4 | 2020 | 4 | 2020 |
| .50 Caliber Pre-Production Qualification Test (PPQT) | 4 | 2020 | 2 | 2021 |
| .50 Caliber Critical Design Review (CDR) | 4 | 2021 | 4 | 2021 |
| .50 Caliber Production Qualification Test (PQT) | 1 | 2022 | 3 | 2022 |

UNCLASSIFIED

| | | | |
|--|---|--|------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) EP3 / Reduced Range Ammunition - Small Caliber | |

| Events | Start | | End | |
|--------------------------------|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| .50 Caliber Milestone C (MS C) | 2 | 2023 | 2 | 2023 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|------------|
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EP4: One-Way Luminescence for Small Caliber Ammo | - | 0.000 | 6.077 | 8.547 | - | 8.547 | 12.391 | 5.387 | 6.500 | 3.000 | 0.000 | 41.902 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

The small caliber One Way Luminescence (OWL) technology applies to multiple calibers. In FY 2019, Budget Activity 4 Program Element (PE) 0603639A, Project EB8, 7.62mm OWL transitions to Budget Activity 5 (BA5) PE 0604802A, Project EP4, 7.62mm OWL. OWL technologies will be assessed for adaptability to the new Next Generation Squad Weapons (NGSW) ammunition; which will be further developed and fielded under a separate funding line in the future.

A. Mission Description and Budget Item Justification

The One Way Luminescence (OWL) project is a critical technology development in response to the 7.62mm and 5.56mm Families of Ammunition Capabilities Development Documents (CDD) and .50 Caliber Munitions 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. The OWL projects 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 .50 Caliber cartridges and Next Generation Squad Weapons (NGSW) ammunition. FY 2020 funding will support continuing Engineering and Manufacturing Development (EMD) efforts, conducting a Critical Design review (CDR), performing development tests, and a User Assessment (UA) for the 7.62mm variant. FY 2020 also supports concept development/evaluation of OWL tracer solutions for .50 Caliber weapons and NSGW.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Engineering and Manufacturing Development (EMD) | - | 5.855 | 8.347 | - | 8.347 |
| Description: Engineering and Manufacturing Development (EMD) efforts for the 7.62mm variant followed by OWL tracer solutions for .50 Caliber weapons. | | | | | |
| FY 2019 Plans: FY 2019 activities supports EMD and early manufacturing efforts with the 7.62mm OWL design. 7.62mm designs will undergo Verification Testing, Preliminary Design Review (PDR), and a User Assessment (UA). | | | | | |
| FY 2020 Base Plans: | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|--|---------|---------|--|-------------|---------------|--|------------------|--------------|-------------|------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | Date: March 2019 | | | | |
| 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 | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | |
| Continue Engineering and Manufacturing Development (EMD) efforts, conduct a Critical Design review (CDR), perform development tests, and a User Assessment (UA) for the 7.62mm OWL ammunition. Evaluate OWL prototypes/concepts ammunition for .50 Caliber Weapons. FY 2019 to FY 2020 Increase/Decrease Statement: Planned EMD contract. | | | | | | | | | | | |
| Title: Prototype and Concept Evaluation for Next Generation Squad Weapons (NGSW) Description: Supports concept development/evaluation of OWL tracer solutions for .50 Caliber weapons and NGSW. FY 2020 Base Plans: Evaluate OWL prototypes/concepts ammunition for the Next Generation Squad Weapons (NGSW). Assess OWL technologies for potential to adapt the technology into the NGSW ammunition. FY 2019 to FY 2020 Increase/Decrease Statement: Planned assessment of OWL technologies. | | | | | | - | - | 0.200 | - | 0.200 | |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | | - | 0.222 | - | - | - | |
| Accomplishments/Planned Programs Subtotals | | | | | | - | 6.077 | 8.547 | - | 8.547 | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • EB8: OWL for Small Caliber Ammunition | 4.097 | 2.174 | 2.000 | - | 2.000 | - | - | - | - | 0.000 | 8.271 |
| 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 and NGSW ammunition. As the technology matures the effort transitions from Budget Activity 4 (BA4) Program Element 0603639A, Project EB8 to Budget Activity 5 (BA5) Program Element 0604802A, Project EP4 in FY 2019 for 7.62mm, and FY 2021 for 5.56mm. The | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | |
|--|---------|---------|-----------------|---|------------------|---------|---|------------------|---------|--------------------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete Total Cost |
| 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. The FY 2017 and FY 2018 TRAs were conducted to evaluate the industry and Government concepts in order to proceed with the 7.62mm Engineering and Manufacturing Development (EMD). The 5.56mm, NGSW, and .50 Caliber cartridges will follow the 7.62mm schedule with Engineering and Manufacturing Development (EMD) starting in FY 2021 for the 5.56mm variant. The new tracer cartridges will replace legacy tracers in each of the various small caliber configurations. | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | |
| N/A | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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) | Various | Picatinny Arsenal : New Jersey | - | - | | 0.028 | Oct 2018 | 0.027 | Oct 2019 | - | | 0.027 | Continuing | Continuing | Continuing |
| EMD Contractor # 1 | Option/ CPFF | General Dynamics : Florham Park, NJ | - | - | | 1.300 | Jan 2019 | 2.100 | Jan 2020 | - | | 2.100 | Continuing | Continuing | Continuing |
| EMD Contractor # 2 | Option/ CPFF | Nammo Tally : Mesa, AZ | - | - | | 1.300 | Jan 2019 | 2.100 | Jan 2020 | - | | 2.100 | Continuing | Continuing | Continuing |
| OWL Manufacturing Tooling Development | Option/ CPFF | JAK Tool Engineering Solutions : Cranbury, NJ | - | - | | 0.206 | Nov 2018 | - | | - | | - | 0.000 | 0.206 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.222 | | - | | - | | - | 0.000 | 0.222 | - |
| Subtotal | | | - | - | | 3.056 | | 4.227 | | - | | 4.227 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | - | - | | 1.716 | Oct 2018 | 2.070 | Oct 2019 | - | | 2.070 | Continuing | Continuing | Continuing |
| Subtotal | | | - | - | | 1.716 | | 2.070 | | - | | 2.070 | Continuing | Continuing | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 Ground : Maryland | - | - | | 0.650 | Oct 2018 | 1.250 | Oct 2019 | - | | 1.250 | Continuing | Continuing | Continuing |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|------------------------|---|-------------|---------|------------|--|------------|--------------|------------|--|------------|------------------|------------------|------------|--------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | | | |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Independent Testing | MIPR | Joint Munitions Command/ Bullet Suuply Organization : Lake City, MO | - | - | | 0.035 | Oct 2018 | - | | - | | - | 0.000 | 0.035 | - |
| User Evaluation | MIPR | US Army Maneuver Battle Labs : Fort Benning, GA | - | - | | 0.400 | Oct 2018 | - | | - | | - | 0.000 | 0.400 | - |
| Development Testing & Evaluation | TBD | To Be Determined : To Be Determined | - | - | | - | | 1.000 | Oct 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| Radar Testing | MIPR | US Army Research Lab : Aberdeen, MD | - | - | | 0.200 | Oct 2018 | - | | - | | - | 0.000 | 0.200 | - |
| Tracer Testing | MIPR | US Army Night Vision Lab : Aberdeen, MD | - | - | | 0.020 | Oct 2018 | - | | - | | - | 0.000 | 0.020 | - |
| Subtotal | | | - | - | | 1.305 | | 2.250 | | - | | 2.250 | Continuing | Continuing | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | - | | 6.077 | | 8.547 | | - | | 8.547 | Continuing | Continuing | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

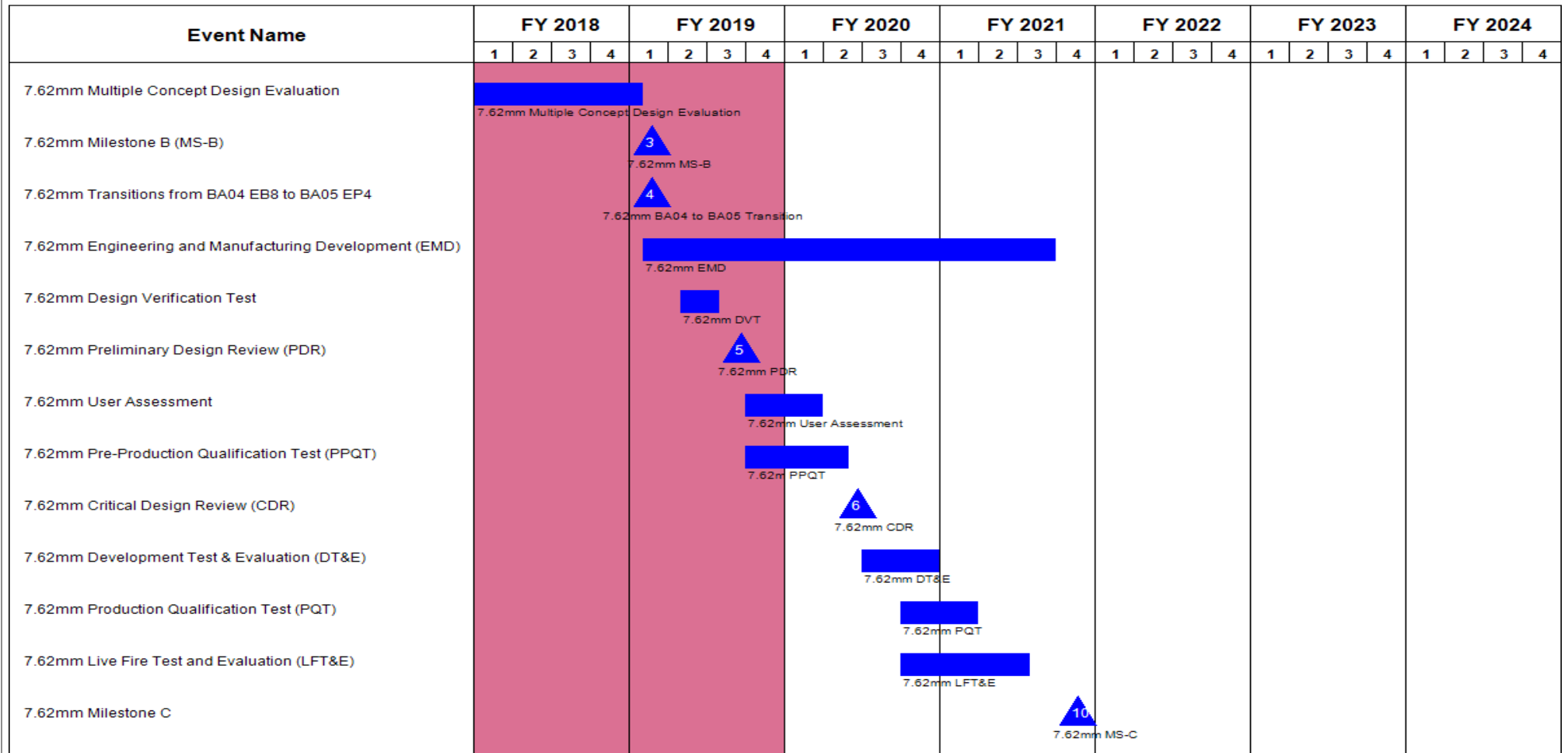
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army

Date: March 2019

Appropriation/Budget Activity
2040 / 5

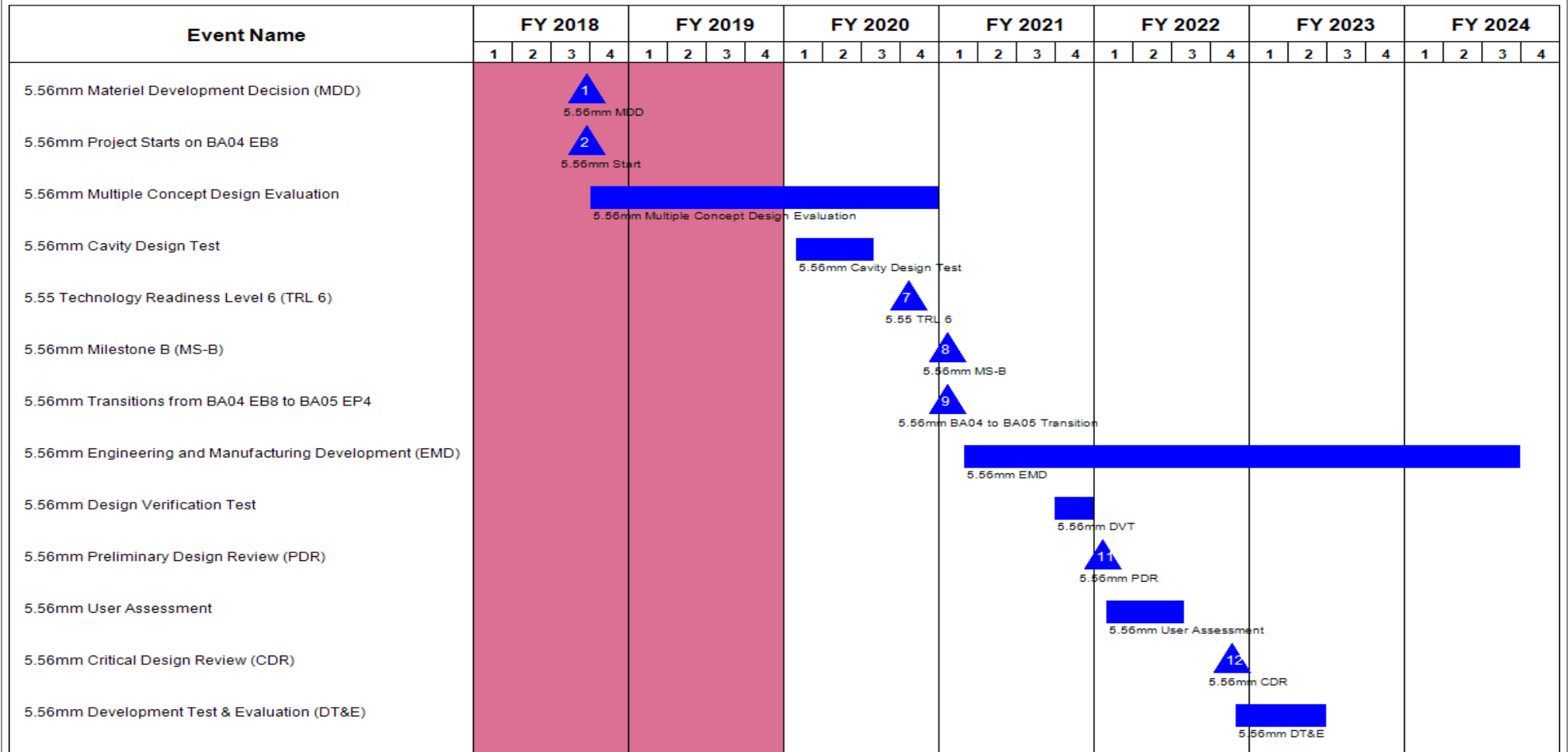
R-1 Program Element (Number/Name)
PE 0604802A / Weapons and Munitions -
Eng Dev

Project (Number/Name)
EP4 / One-Way Luminescence for Small
Caliber Ammo



UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 | |



UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------|---|---|---|---------|---|---|--|---------|---|---|---|---------|---|---|--|---------|---|---|---|---------|---|---|---|-----------------------------------|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | | | | | | | | | | | | | | Date: March 2019 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | | | | | | | | | | | | | | | | | |
| | 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 Production Qualification Testing (PQT) | | | | | | | | | | | | | | | | | | | | | | | | | <div></div> <div>5.56mm PQT</div> | | | | | | | | | | | | | | | | | | | |
| 5.56mm Live-Fire Test and Evlauation (LFT&E) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | <div></div> <div>5.56mm LFT&E</div> | | | |
| 5.56mm Milestone C (MS-C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW & .50 caliber Concept Design Evaluation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|--|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i> | |

Schedule Details

| Events | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| 7.62mm Multiple Concept Design Evaluation | 1 | 2015 | 1 | 2019 |
| 7.62mm Milestone B (MS-B) | 1 | 2019 | 1 | 2019 |
| 7.62mm Transitions from BA04 EB8 to BA05 EP4 | 1 | 2019 | 1 | 2019 |
| 7.62mm Engineering and Manufacturing Development (EMD) | 1 | 2019 | 3 | 2021 |
| 7.62mm Design Verification Test | 2 | 2019 | 3 | 2019 |
| 7.62mm Preliminary Design Review (PDR) | 3 | 2019 | 3 | 2019 |
| 7.62mm User Assessment | 4 | 2019 | 1 | 2020 |
| 7.62mm Pre-Production Qualification Test (PPQT) | 4 | 2019 | 2 | 2020 |
| 7.62mm Critical Design Review (CDR) | 2 | 2020 | 2 | 2020 |
| 7.62mm Development Test & Evaluation (DT&E) | 3 | 2020 | 4 | 2020 |
| 7.62mm Production Qualification Test (PQT) | 4 | 2020 | 1 | 2021 |
| 7.62mm Live Fire Test and Evaluation (LFT&E) | 4 | 2020 | 3 | 2021 |
| 7.62mm Milestone C | 4 | 2021 | 4 | 2021 |
| 5.56mm Materiel Development Decision (MDD) | 3 | 2018 | 3 | 2018 |
| 5.56mm Project Starts on BA04 EB8 | 3 | 2018 | 3 | 2018 |
| 5.56mm Multiple Concept Design Evaluation | 4 | 2018 | 4 | 2020 |
| 5.56mm Cavity Design Test | 1 | 2020 | 3 | 2020 |
| 5.55 Technology Readiness Level 6 (TRL 6) | 4 | 2020 | 4 | 2020 |
| 5.56mm Milestone B (MS-B) | 1 | 2021 | 1 | 2021 |
| 5.56mm Transitions from BA04 EB8 to BA05 EP4 | 1 | 2021 | 1 | 2021 |
| 5.56mm Engineering and Manufacturing Development (EMD) | 1 | 2021 | 3 | 2024 |
| 5.56mm Design Verification Test | 4 | 2021 | 4 | 2021 |

UNCLASSIFIED

| | |
|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | Date: March 2019 |
|---|-------------------------|

| | | |
|--|--|--|
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EP4 / <i>One-Way Luminescence for Small Caliber Ammo</i> |
|--|--|--|

| Events | Start | | End | |
|---|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| 5.56mm Preliminary Design Review (PDR) | 1 | 2022 | 1 | 2022 |
| 5.56mm User Assessment | 1 | 2022 | 3 | 2022 |
| 5.56mm Critical Design Review (CDR) | 4 | 2022 | 4 | 2022 |
| 5.56mm Development Test & Evaluation (DT&E) | 4 | 2022 | 2 | 2023 |
| 5.56mm Production Qualification Testing (PQT) | 4 | 2023 | 1 | 2024 |
| 5.56mm Live-Fire Test and Evaluation (LFT&E) | 4 | 2023 | 1 | 2024 |
| 5.56mm Milestone C (MS-C) | 4 | 2024 | 4 | 2024 |
| NGSW & .50 caliber Concept Design Evaluation | 1 | 2020 | 3 | 2020 |

Note

As the technology matures, the One Way Luminescence (OWL) projects transitions from Budget Activity 4 (BA4) PE 0603639A, Project EB8 to Budget Activity 5 (BA5) PE 0604802A, Project EP4.

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|------------|
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo | - | 13.318 | 16.748 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 30.066 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

The small caliber Advanced Armor-Piercing (ADVAP) technology applies to multiple calibers. In FY 2017, Program Element (PE) 0603639A, Project EC2, Adv Armor-Piercing (ADVAP) for Small Cal Ammo transitioned to PE 0604802A, Project EP5, Adv Armor-Piercing (ADVAP) for Small Cal Ammo for development of the 7.62mm ammunition. The follow-on effort for ADVAP ammunition calibers below 7.62mm begins in FY 2019. In FY 2020, PE 0604802A, Project EP5, Adv Armor-Piercing (ADVAP) for Small Cal Ammo transitions to PE 0604802A, Project FL4, Small Caliber Ammo for Next Gen Squad Weapons (NGSW) to continue development efforts on ADVAP ammunition for the NGSW.

A. Mission Description and Budget Item Justification

Advanced Armor-Piercing (ADVAP): The ADVAP project is a critical technology development in response to the 7.62mm and 5.56mm Family of Ammunition Capabilities Development Documents (CDD). The nomenclature for the 7.62mm ADVAP is XM1158. The overall objective of the ADVAP project is to develop and Full Materiel Release (FMR) both 7.62mm XM1158 cartridge for the M240 machine gun and ADVAP ammunition in calibers below 7.62mm. The ADVAP ammunition in calibers below 7.62mm for the Next Generation Squad Weapons is referred to as the Special Purpose ammunition. The objective is to provide overmatch capability to defeat advanced light armored threats within typical machine gun engagement ranges. No funding requested in FY 2020.

Next Generation Squad Weapon (NGSW) Family of Ammunition: The NGSW ammo is a new ammunition technology under development for use in the Next Generation Squad Weapon systems. The objective is to develop and Full Materiel Release (FMR) the new ammunition. No funding requested in FY 2020.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: 7.62mm Engineering & Manufacturing Development (EMD) | 13.318 | 11.978 | - | - | - |
| Description: Develop, demonstrate, and qualify XM1158 Small Caliber Ammunition 7.62mm Advanced Armor Piercing (ADVAP) cartridges in order to defeat threat targets and provide overmatch capability versus a broad spectrum of hard targets. | | | | | |
| FY 2019 Plans: FY 2019 efforts will focus on continuing the support of Engineering and Manufacturing Development (EMD) activities such as Developmental Testing and Evaluation (DT&E). FY 2019 also includes an Urgent Materiel | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|---|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | Date: March 2019 | | |
| 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 | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Release (UMR) to accelerate the fielding of the 7.62mm ADVAP cartridge and preparation for an accelerated Milestone C accomplishment at the end of FY 2019. FY 2019 to FY 2020 Increase/Decrease Statement: The project has a planned Milestone C in FY 2019. No RDTE funding in FY 2020 because the project transitions to production. | | | | | | | | | | | |
| Title: NGSW Rapid Prototyping and Development Description: Develop, demonstrate, and qualify new ammunition for the Next Generation Squad Weapon (NGSW) systems. FY 2019 Plans: Begin rapid prototyping/development efforts on the General Purpose (GP) projectile for the Next Generation Squad Weapons (NGSW), build and evaluate concepts/prototypes, conduct Initial Product Reviews (IPRs), and perform activities to prepare for the Preliminary Design Review (PDR) and Prototype Testing planned in FY 2020. FY 2019 to FY 2020 Increase/Decrease Statement: The effort transitions to PE 0604802A / Project FL4 in FY 2020. | | | | | | | - | 4.019 | - | - | - |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | | | - | 0.751 | - | - | - |
| Accomplishments/Planned Programs Subtotals | | | | | | | 13.318 | 16.748 | - | - | - |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • EC2: Adv Armor-Piercing (ADVAP) for Small Cal Ammo | - | 3.755 | 6.821 | - | 6.821 | - | - | - | - | 0.000 | 10.576 |
| • F57510: CTG, 7.62mm Advanced Armor Piercing, XM1158 | - | 25.000 | 0.000 | 21.013 | 21.013 | 22.984 | 25.682 | 25.692 | - | 0.000 | 120.371 |

UNCLASSIFIED

| | | | | | | | | | | | |
|---|---------|---------|-----------------|--|------------------|---------|---------|--|------------------|---------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | Date: March 2019 | | |
| 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) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • FL4: Small Caliber Ammo for Next Gen Squad Weapons | - | - | 22.880 | - | 22.880 | 30.630 | 28.750 | 25.000 | 11.750 | 0.000 | 119.010 |
| Remarks | | | | | | | | | | | |
| Budget Activity 4 PE 0603639A, Project EC2-RDTE/Adv Armor-Piercing (ADVAP) for Small Cal Ammo: This funding line started the development, technology maturation, and Pre-Engineering & Manufacturing Development (Pre-EMD) work on 7.62mm ADVAP cartridges and initiates rapid prototyping work on the Special Purpose (SP)/ADVAP ammunition in calibers below 7.62mm. | | | | | | | | | | | |
| Procurement of Ammunition, Army F57510-AMMO/CTG, 7.62mm Advanced Armor Piercing, XM1158: This funding line supports the procurement of 7.62mm XM1158 Advanced Armor-Piercing (ADVAP) Ball Cartridges 4Ball/1 M62A1 Tracer linked Cartridges. | | | | | | | | | | | |
| Budget Activity 5 PE 0604802A, Project FL4-RDTE/Small Caliber Ammo for Next Gen Squad Weapons: This funding line continues rapid development/prototyping work on the Next Gen General Purpose (GP) ammunition and Special Purpose (SP) ammunition. | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| Advanced Armor-Piercing (ADVAP): The ADVAP ammunition programs will use a Government developed design and manufacturing processes. Multiple component contracts will be awarded to purchase raw materials and equipment. In FY 2017, the 7.62mm variant, achieved Milestone B; completed Production Decision Review (PDR), and Integrated Baseline Review (IBR) leading to the establishment of the Performance Measurement Baseline and the approval to begin manufacturing the Pre-Production Qualification Testing (PPQT) sample. | | | | | | | | | | | |
| Next Generation Squad Weapon (NGSW) Family of Ammunition: The Next Generation Squad Weapon (NGSW) ammunition program will utilize rapid prototyping acquisition strategy under Section 804 Authority to develop ammunition concepts/designs for the General Purpose (GP) variant and the Special Purpose (SP) variant. Contractors will be funded to rapidly develop projectile designs/concepts with a final down-select to one design prior to Urgent Material Release (UMR) in FY 2022. Follow-on development efforts for additional NSGW ammunition variants including tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition will start in FY 2022. | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|--|------------------------|--|-------------|---------|------------|--|------------|--------------|------------|--|------------|------------------|------------------|------------|--------------------------|
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| ADVAP Program Manager Maneuver Ammunition Systems (PM MAS) | Various | Picatinny Arsenal : New Jersey | 0.190 | 0.230 | Oct 2017 | 0.048 | Oct 2018 | - | | - | | - | 0.000 | 0.468 | - |
| ADVAP Raw Materials | Various | Various : New Jersey | 3.196 | 1.812 | Mar 2018 | 2.622 | Jan 2019 | - | | - | | - | 0.000 | 7.630 | - |
| ADVAP Facilitization and Prototyping | MIPR | Picatinny Arsenal : New Jersey | 1.142 | 1.200 | Mar 2018 | 1.200 | Jan 2019 | - | | - | | - | 0.000 | 3.542 | 4.900 |
| NGSW Program Manager Maneuver Ammunition Systems (PM MAS) | Various | Picatinny Arsenal : New Jersey | - | - | | 0.028 | Oct 2018 | - | | - | | - | 0.000 | 0.028 | - |
| NGSW Rapid Prototyping Contract (Vendor 1) | C/CPFF | Northrop Grumman Innovation Systems : Independence, MO | - | - | | 2.564 | Jan 2019 | - | | - | | - | 0.000 | 2.564 | - |
| NGSW Rapid Prototyping Contract (Vendor 2) | C/CPFF | JAK Tool Engineering Solutions : Cranbury, NJ | - | - | | 1.151 | Jan 2019 | - | | - | | - | 0.000 | 1.151 | - |
| Prototype Packaging Development | Option/ CPFF | JAK Tool Engineering Solutions : Cranbury, NJ | - | 0.284 | Mar 2018 | - | | - | | - | | - | 0.000 | 0.284 | - |
| Packaging Components | Option/ FFP | OLIN Winchester Corporation : Oxford, MS | - | 0.438 | Apr 2018 | - | | - | | - | | - | 0.000 | 0.438 | - |
| Propellant Dvelopment | Option/ CPFF | St. Marks Powder : Summerville, SC | - | 0.083 | Oct 2017 | - | | - | | - | | - | 0.000 | 0.083 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.751 | | - | | - | | - | 0.000 | 0.751 | - |
| Subtotal | | | 4.528 | 4.047 | | 8.364 | | - | | - | | - | 0.000 | 16.939 | N/A |
| | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| ADVAP Armament Research Development and Engineering Center (ARDEC) | MIPR | Picatinny Arsenal : New Jersey | 4.687 | 5.441 | Oct 2017 | 4.303 | Oct 2018 | - | | - | | - | 0.000 | 14.431 | - |
| ADVAP Army Research Lab (ARL) | MIPR | Aberdeen Proving Ground : Maryland | 1.566 | 1.250 | Oct 2017 | 1.010 | Oct 2018 | - | | - | | - | 0.000 | 3.826 | - |
| ADVAP Manufacturing Support | C/FP | UTRS : New Jersey | 0.600 | 1.330 | Oct 2017 | - | | - | | - | | - | 0.000 | 1.930 | - |
| ADVAP Facilitization Support | MIPR | Armament Research Development and Engineering Center : Picatinny Arsenal, New Jersey | 0.618 | - | | - | | - | | - | | - | 0.000 | 0.618 | - |
| NGSW Armament Research Development and Engineering Center (ARDEC) | MIPR | Picatinny Arsenal : New Jersey | - | - | | 0.201 | Oct 2018 | - | | - | | - | 0.000 | 0.201 | - |
| NGSW Army Research Lab (ARL) | MIPR | Aberdeen Proving Ground : Maryland | - | - | | 0.075 | Oct 2018 | - | | - | | - | 0.000 | 0.075 | - |
| Subtotal | | | 7.471 | 8.021 | | 5.589 | | - | | - | | - | 0.000 | 21.081 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| ADVAP U.S. Army Aberdeen Test Center (ATC) | MIPR | Aberdeen Proving Ground : Maryland | 0.103 | 0.400 | Jan 2018 | 0.870 | Oct 2018 | - | | - | | - | 0.000 | 1.373 | - |
| ADVAP Limited User Test | MIPR | Maneuver Battle Labs : Fort Benning, Georgia | - | - | | 0.150 | Oct 2018 | - | | - | | - | 0.000 | 0.150 | - |
| ADVAP ARDEC Testing | MIPR | ARDEC : Picatinny Arsenal, New Jersey | 0.350 | 0.850 | Feb 2018 | 0.650 | Oct 2018 | - | | - | | - | 0.000 | 1.850 | - |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|--|--|--|--|--|---|--|--|--|---|--|-------------------------|--|--|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | | | |

| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| ADVAP ARL Live Fire Test and Evaluation | MIPR | ARL : Aberdeen, Maryland | - | - | | 1.125 | Oct 2018 | - | | - | | - | 0.000 | 1.125 | - |
| Subtotal | | | 0.453 | 1.250 | | 2.795 | | - | | - | | - | 0.000 | 4.498 | N/A |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| Project Cost Totals | 12.452 | 13.318 | 16.748 | - | - | - | 0.000 | 42.518 | N/A |

Remarks

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| ADVAP 7.62mm Engineering & Manufacturing Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADVAP 7.62mm Pre-Production Qualification Testing (PPQT) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADVAP 7.62mm Critical Design Review (CDR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADVAP 7.62mm Development Test & Evaluation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADVAP 7.62mm Urgent Materiel Release (UMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADVAP 7.62mm Milestone C | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ADVAP 7.62mm Full Materiel Release (FMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Rapid Prototyping | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Initial Product Review 1 (IPR 1) Special Purpose | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Preliminary Design Review General Purpose (PDR-GP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Initial Product Review 2 (IPR 2) Special Purpose | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Project BA05 EP5 to Project BA05 FL4 Transition | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Preliminary Design Review Special Purpose (PDR-SP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| NGSW Ammo Critical Design Review General Purpose (CDR-GP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Prototype Test 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Initial Product Review 3 (IPR 3) Special Purpose | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Critical Design Review Special Purpose (CDR-SP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Prototype Test 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Urgent Materiel Release General Purpose (UMR GP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Urgent Materiel Release Special Purpose (UMR SP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Rapid Fielding | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Production Qualification Testing Special Purpose (PQT SP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NGSW Ammo Full Materiel Release (FMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|---|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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 | |

Schedule Details

| Events | Start | | End | |
|--|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| ADVAP 7.62mm Advanced Concept Development | 1 | 2015 | 1 | 2017 |
| ADVAP 7.62mm Prototype Test & Evaluation | 1 | 2015 | 1 | 2017 |
| ADVAP 7.62mm Engineering & Manufacturing Development | 2 | 2017 | 4 | 2019 |
| ADVAP 7.62mm Pre-Production Qualification Testing (PPQT) | 1 | 2018 | 1 | 2018 |
| ADVAP 7.62mm Critical Design Review (CDR) | 2 | 2018 | 2 | 2018 |
| ADVAP 7.62mm Development Test & Evaluation | 1 | 2019 | 3 | 2019 |
| ADVAP 7.62mm Urgent Materiel Release (UMR) | 2 | 2019 | 2 | 2019 |
| ADVAP 7.62mm Milestone C | 4 | 2019 | 4 | 2019 |
| ADVAP 7.62mm Full Materiel Release (FMR) | 2 | 2020 | 2 | 2020 |
| NGSW Ammo Rapid Prototyping | 1 | 2019 | 2 | 2024 |
| NGSW Ammo Initial Product Review 1 (IPR 1) Special Purpose | 2 | 2019 | 2 | 2019 |
| NGSW Ammo Preliminary Design Review General Purpose (PDR-GP) | 3 | 2019 | 3 | 2019 |
| NGSW Ammo Initial Product Review 2 (IPR 2) Special Purpose | 4 | 2019 | 4 | 2019 |
| NGSW Ammo Project BA05 EP5 to Project BA05 FL4 Transition | 1 | 2020 | 1 | 2020 |
| NGSW Ammo Preliminary Design Review Special Purpose (PDR-SP) | 2 | 2020 | 2 | 2020 |
| NGSW Ammo Critical Design Review General Purpose (CDR-GP) | 3 | 2020 | 3 | 2020 |
| NGSW Ammo Prototype Test 1 | 3 | 2020 | 4 | 2020 |
| NGSW Ammo Initial Product Review 3 (IPR 3) Special Purpose | 4 | 2020 | 4 | 2020 |
| NGSW Ammo Critical Design Review Special Purpose (CDR-SP) | 2 | 2021 | 2 | 2021 |
| NGSW Ammo Prototype Test 2 | 2 | 2021 | 3 | 2021 |
| NGSW Ammo Urgent Materiel Release General Purpose (UMR GP) | 4 | 2022 | 4 | 2022 |
| NGSW Ammo Urgent Materiel Release Special Purpose (UMR SP) | 4 | 2022 | 4 | 2022 |

UNCLASSIFIED

| | | | | |
|---|---|------|---|------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 | |
| 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 | |
| | Start | | End | |
| Events | Quarter | Year | Quarter | Year |
| NGSW Ammo Rapid Fielding | 4 | 2022 | 1 | 2026 |
| NGSW Ammo Production Qualification Testing Special Purpose (PQT SP) | 1 | 2023 | 2 | 2023 |
| NGSW Ammo Full Materiel Release (FMR) | 2 | 2024 | 2 | 2024 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|--------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EP7 / Aviation Airborne Expendable Countermeasures | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EP7: Aviation Airborne Expendable Countermeasures | - | 0.000 | 7.213 | 4.920 | - | 4.920 | 4.480 | 8.250 | 0.000 | 0.000 | 0.000 | 24.863 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| 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 and aircraft expendables (to include Radio Frequency (RF) expendables). | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Improvements to countermeasure flares | | | | | | | | - | 6.948 | 4.920 | - | 4.920 |
| Description: This program will develop improvements to legacy countermeasure flare solutions and qualify them for Army use. | | | | | | | | | | | | |
| FY 2019 Plans: Develop required documentation to support milestone A decision. Develop and execute demonstration efforts to analyze various potential solutions. Conduct flight effectiveness testing on Army platforms based on Modeling and Simulation (M&S) results. | | | | | | | | | | | | |
| FY 2020 Base Plans: Continue data analysis and evaluation of prototypes and flight effectiveness testing on Army platforms based on modelling and simulation (M&S) results. Down select potential solutions to transition to the Engineering, Manufacturing and Development (EMD) Phase for XM215 and Radio Frequency (RF) Passive countermeasure solutions. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: Funding has been adjusted from FY19 to FY20 as the program approaches Milestone B. | | | | | | | | | | | | |
| Title: FY 2019 SBIR / STTR Transfer | | | | | | | | - | 0.265 | - | - | - |
| FY 2019 Plans: | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) EP7 / Aviation Airborne Expendable Countermeasures | |

| | | | | | |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| FY 2019 SBIR / STTR Transfer | | | | | |
| <i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> FY 2019 SBIR / STTR Transfer | | | | | |
| Accomplishments/Planned Programs Subtotals | - | 7.213 | 4.920 | - | 4.920 |

| | | | | | | | | | | | |
|--|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • EB9: Aviation Airborne Expandable Countermeasures | 8.500 | 2.471 | 3.186 | - | 3.186 | 4.500 | 6.060 | - | - | 0.000 | 24.717 |
| Remarks | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| The Acquisition strategy is under development and Milestone Decision Authority (MDA) was approved in 3Q FY2017. It is anticipated that these items will be restricted to the National Technology and Industrial Base (NTIB). | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | Project (Number/Name) EP7 / Aviation Airborne Expendable Countermeasures | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Product Development | C/FFP | ACC : PICATINNY ARSENAL | - | - | | 2.550 | Apr 2019 | 2.570 | May 2020 | - | | 2.570 | 0.000 | 5.120 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.265 | | - | | - | | - | 0.000 | 0.265 | - |
| Subtotal | | | - | - | | 2.815 | | 2.570 | | - | | 2.570 | 0.000 | 5.385 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Engineering Support XM215 | MIPR | ARDEC : Picatinny Arsenal | - | - | | 2.598 | Feb 2018 | 0.103 | Dec 2019 | - | | 0.103 | 0.000 | 2.701 | - |
| Engineering Support RF | MIPR | ARDEC : Picatinny Arsenal | - | - | | - | | 0.250 | Dec 2019 | - | | 0.250 | 0.000 | 0.250 | - |
| Subtotal | | | - | - | | 2.598 | | 0.353 | | - | | 0.353 | 0.000 | 2.951 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Flight Testing RF | MIPR | AED : Redstone Arsenal | - | - | | 1.800 | Aug 2019 | 1.997 | Jun 2020 | - | | 1.997 | 0.000 | 3.797 | - |
| Subtotal | | | - | - | | 1.800 | | 1.997 | | - | | 1.997 | 0.000 | 3.797 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | - | | 7.213 | | 4.920 | | - | | 4.920 | 0.000 | 12.133 | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|--|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | Project (Number/Name) EP7 / Aviation Airborne Expendable Countermeasures |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| Develop Modeling and Simulation solutions and payload configurations | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Milestone B XM 215 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Milestone C XM215 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Milestone B RF | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RF Final Prototype Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RF Flight Effectiveness Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Milestone C RF | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EP7 / <i>Aviation Airborne Expendable Countermeasures</i> | |

Schedule Details

| Events | Start | | End | |
|--|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| Develop Modeling and Simulation solutions and payload configurations | 4 | 2018 | 1 | 2021 |
| Milestone B XM 215 | 4 | 2020 | 4 | 2020 |
| Milestone C XM215 | 4 | 2022 | 4 | 2022 |
| Milestone B RF | 3 | 2020 | 3 | 2020 |
| RF Final Prototype Development | 4 | 2020 | 1 | 2021 |
| RF Flight Effectiveness Testing | 4 | 2020 | 1 | 2021 |
| Milestone C RF | 1 | 2022 | 1 | 2022 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EU4: 40mm HV Improved High Explosive Dual Purpose | - | 2.191 | 7.201 | 13.055 | - | 13.055 | 2.935 | 2.313 | 0.000 | 0.000 | 0.000 | 27.695 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| A. Mission Description and Budget Item Justification | | | | | | | | | | | | |
| 40mm High Velocity (HV) High Explosive Dual Purpose - Airburst (HEDP-AB) is a new capability identified in the 40mm High Velocity Improved High Explosive Dual Purpose Cartridge Capability Development Document (CDD) and will provide the Mk19 Mod 3 Grenade Machine Gun (GMG) an airburst capable cartridge with the ability of achieving required lethal effects against enemy targets in the open and in defilade while maintaining the capability to defeat unarmored and lightly armored vehicles. FY 2020 funding supports Engineering and Manufacturing Development (EMD) activities including Design Engineering Test (DET) 1, DET 2, Soldier Touch Point (Limited User Evaluation), Family of Weapon Sights - Crew Served (FWS-CS) Integration, and preparation for the contractor down-selection. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Engineering Manufacturing Development Activities | | | | | | | | 2.191 | - | - | - | - |
| Description: Prepare for Milestone B approval, develop Request for Proposal (RFP) documentation, and create test plans. | | | | | | | | | | | | |
| Title: Engineering Manufacturing Development | | | | | | | | - | 6.937 | 13.055 | - | 13.055 |
| Description: Award EMD contracts to support Design Engineering Testing (DET) and Design Verification Testing (DVT) of the 40mm dual purpose airburst capability. | | | | | | | | | | | | |
| FY 2019 Plans: Funding in FY 2019 supports EMD activities including Source Selection, Contract Award, Design Engineering Test (DET) 1, and Test Readiness Review. | | | | | | | | | | | | |
| FY 2020 Base Plans: FY 2020 funding supports EMD activities including Design Engineering Test (DET) 1, DET 2, Limited User Evaluation (LUE), Family of Weapon Sights - Crew Served (FWS-CS) Integration, and preparation for the contractor down-selection. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: Program increase required for continued contractor development, DET, and LUE. | | | | | | | | | | | | |
| Title: FY 2019 SBIR / STTR Transfer | | | | | | | | - | 0.264 | - | - | - |

UNCLASSIFIED

| | | | | | |
|--|--|---|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | |
| 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 | |

| | | | | | |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| <i>FY 2019 Plans:</i> FY 2019 SBIR / STTR Transfer | | | | | |
| <i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> FY 2019 SBIR / STTR Transfer | | | | | |
| Accomplishments/Planned Programs Subtotals | 2.191 | 7.201 | 13.055 | - | 13.055 |

| | | | | | | | | | | | |
|--|-----------------------|-----------------------|----------------------------|---------------------------|-----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------------|--------------------------|
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| <u>Line Item</u> | <u>FY 2018</u> | <u>FY 2019</u> | <u>FY 2020 Base</u> | <u>FY 2020 OCO</u> | <u>FY 2020 Total</u> | <u>FY 2021</u> | <u>FY 2022</u> | <u>FY 2023</u> | <u>FY 2024</u> | <u>Cost To Complete</u> | <u>Total Cost</u> |
| • E70505: CTG, 40mm HV GMG, I-HEDP | - | - | 0.000 | - | 0.000 | 11.549 | 15.222 | 17.535 | - | 0.000 | 44.306 |

Remarks

D. Acquisition Strategy

The 40mm High Velocity High Explosive Dual Purpose Airburst (HEDP-AB) cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. Milestone B approval will be followed by a competitive award for up to two EMD contractors for Design Engineering Test (DET) 1 and DET 2 to qualify the design to support requirements with sufficient confidence to enter into Developmental Test and Evaluation (DT&E). The contractors will develop an Airburst capable fuze to be retrofitted onto the currently fielded, High Explosive Point Detonating cartridges and develop a Programming Unit. Shortcomings and deficiencies will be corrected prior to subjecting the final design to DT&E. Down-select to a single contractor will occur before DT&E and production options. Test results will support the documentation for Milestone C and Type Classification-Limited Procurement (TC-LP). After Milestone C is achieved, a contract will be awarded for Low Rate Initial Production (LRIP) and two production year options.

E. Performance Metrics

N/A

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Project Manager Maneuver Ammunition Systems (PM MAS) | MIPR | Picatinny Arsenal : NJ | 0.014 | 0.228 | Nov 2017 | - | | - | | - | | - | 0.000 | 0.242 | - |
| EMD Contract Award 1 | C/CPFF | TBD : TBD | - | - | | 2.430 | Jun 2019 | 4.548 | Oct 2019 | - | | 4.548 | Continuing | Continuing | Continuing |
| EMD Contract Award 2 | C/CPFF | TBD : TBD | - | - | | 2.430 | Jun 2019 | 4.548 | Oct 2019 | - | | 4.548 | Continuing | Continuing | Continuing |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.264 | | - | | - | | - | 0.000 | 0.264 | - |
| Subtotal | | | 0.014 | 0.228 | | 5.124 | | 9.096 | | - | | 9.096 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Armament Research Development Engineering Center (ARDEC) | MIPR | Picatinny Arsenal : NJ | 0.278 | 1.875 | Oct 2017 | 1.927 | Oct 2018 | 2.000 | Oct 2019 | - | | 2.000 | Continuing | Continuing | Continuing |
| Defense Information Systems Agency (DISA) | MIPR | Defense Information Systems Agency (DISA) : Annapolis, MD | - | 0.088 | Jul 2018 | - | | - | | - | | - | 0.000 | 0.088 | - |
| Subtotal | | | 0.278 | 1.963 | | 1.927 | | 2.000 | | - | | 2.000 | Continuing | Continuing | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Design Engineering Test (DET) 1 | MIPR | Aberdeen Test Center : Aberdeen Proving Ground, MD | - | - | | 0.150 | Aug 2019 | 0.584 | Oct 2019 | - | | 0.584 | 0.000 | 0.734 | - |
| Design Engineering Test (DET) 2 | MIPR | Aberdeen Test Center : Aberdeen Proving Ground, MD | - | - | | - | | 1.375 | Mar 2020 | - | | 1.375 | 0.000 | 1.375 | - |

UNCLASSIFIED

| | | | | | | | | | | | | | | |
|---|--|--|--|--|--|---|--|--|--|--|--|-------------------------|--|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | |
| 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 | | | | |

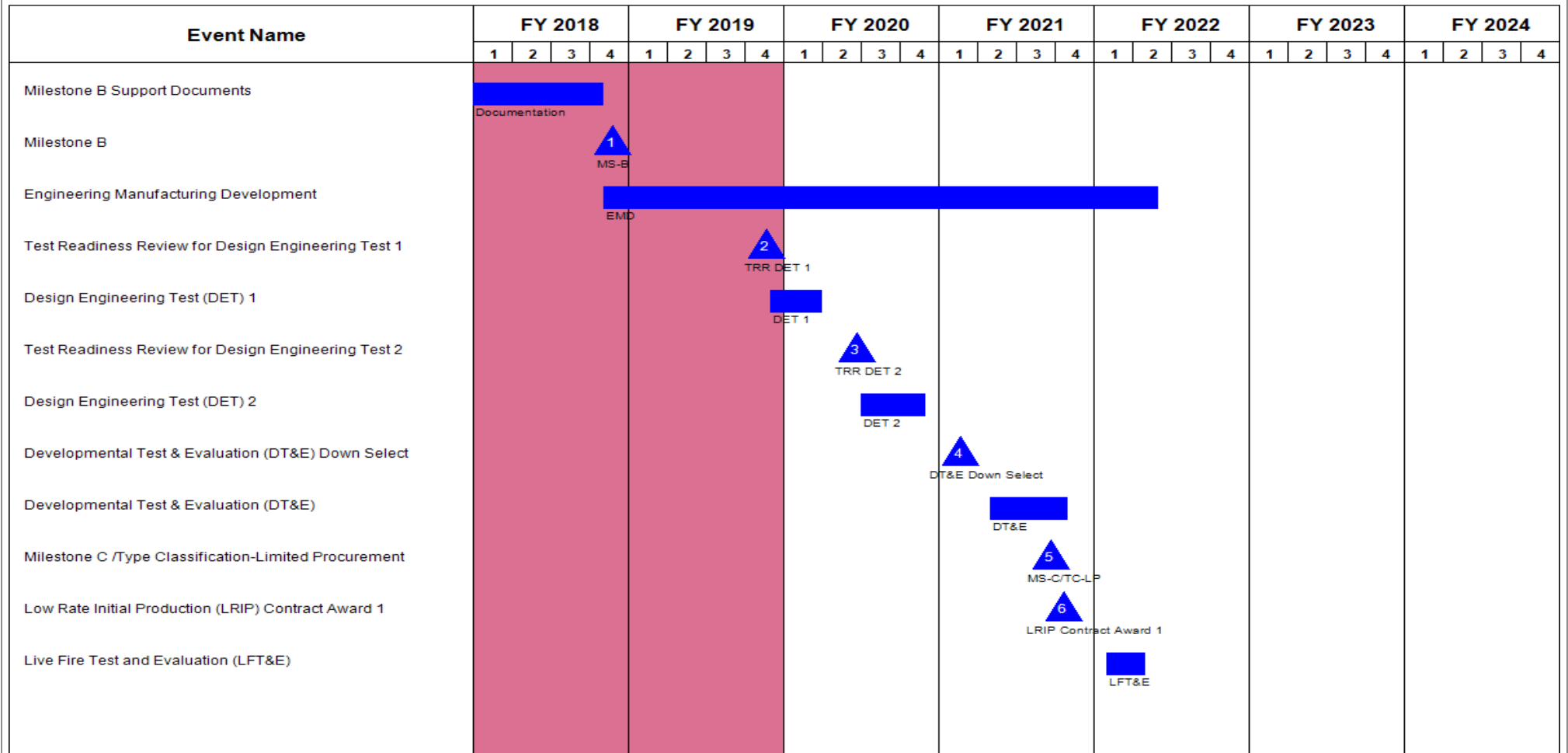
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
|--------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| 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 | | | - | - | | 0.150 | | 1.959 | | - | | 1.959 | 0.000 | 2.109 | N/A |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| Project Cost Totals | 0.292 | 2.191 | 7.201 | 13.055 | - | 13.055 | Continuing | Continuing | N/A |

Remarks

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|--|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 | |



UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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> | |

Schedule Details

| Events | Start | | End | |
|--|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| Milestone B Support Documents | 2 | 2017 | 4 | 2018 |
| Milestone B | 4 | 2018 | 4 | 2018 |
| Engineering Manufacturing Development | 4 | 2018 | 2 | 2022 |
| Test Readiness Review for Design Engineering Test 1 | 4 | 2019 | 4 | 2019 |
| Design Engineering Test (DET) 1 | 4 | 2019 | 1 | 2020 |
| Test Readiness Review for Design Engineering Test 2 | 2 | 2020 | 2 | 2020 |
| Design Engineering Test (DET) 2 | 3 | 2020 | 4 | 2020 |
| Developmental Test & Evaluation (DT&E) Down Select | 1 | 2021 | 1 | 2021 |
| Developmental Test & Evaluation (DT&E) | 2 | 2021 | 4 | 2021 |
| Milestone C /Type Classification-Limited Procurement | 3 | 2021 | 3 | 2021 |
| Low Rate Initial Production (LRIP) Contract Award 1 | 4 | 2021 | 4 | 2021 |
| Live Fire Test and Evaluation (LFT&E) | 1 | 2022 | 2 | 2022 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|----------------|---------|---------|-----------------|---|------------------|---------|---------|---|------------------|---------------------|---------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EU6 / 155mm HE Rocket Assist Project Extended Range | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EU6: 155mm HE Rocket Assist Project Extended Range | - | 0.000 | 6.917 | 8.943 | - | 8.943 | 5.966 | 3.000 | 0.000 | 0.000 | 0.000 | 24.826 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

FY 2020 funding increase supports the Army's modernization priorities in support of the National Defense Strategy.

A. Mission Description and Budget Item Justification

The XM1113 High Explosive Extended Range Artillery Projectile is a critical munition that supports the Army's modernization priorities in support of the National Defense Strategy. The XM1113 is a government owned materiel solution for long-range cannon artillery projectiles that will attain ranges of 40km in 39 caliber weapon systems and 70km in future systems. The XM1113 will provide 33% increased range over obsolete and aging M549A1 Rocket Assisted Projectile using a larger, modern rocket motor and optimized aerodynamic airframe. The XM1113 will leverage enhanced lethality cannon munition technologies to compensate for increased rocket motor volume. The projectile body is filled with an insensitive munition (IM) high explosive (HE) and a supplementary charge to aid in soldier survivability. FY 2020 funds will support fuze performance evaluation and confirmation with XM1113 for Urgent Materiel Release (UMR) in FY 2021, as well as the continued engineering efforts of the XM1113 maturation in support of a Milestone C in FY 2022.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: 155mm High Explosive Rocket Assist Project (RAP) Extended Range | - | 6.664 | 8.943 | - | 8.943 |
| Description: Evaluate, Develop, and Qualify Extended Range Technologies. | | | | | |
| FY 2019 Plans: FY 2019 supports the completion of the Developmental Test phase of Engineering & Manufacturing Development (EMD) and the completion of the Critical Design Review (CDR) in 4Q FY 2019. | | | | | |
| FY 2020 Base Plans: FY 2020 funds will support fuze performance evaluation and confirmation with XM1113 for Urgent Materiel Release (UMR) in FY 2021, as well as the continued engineering efforts of the XM1113 maturation in support of a Milestone C in FY 2022. | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|---|----------------|----------------|---------------------|---|----------------------|----------------|---|----------------|---------------------|-------------------------|----------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | Date: March 2019 | | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | Project (Number/Name) EU6 / 155mm HE Rocket Assist Project Extended Range | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Increase in funding in FY 2020 due to acceleration of qualification efforts per Long Range Precision Fires (LRPF) Cross Functional Team (CFT) priority. | | | | | | | | | | | |
| Title: FY 2019 SBIR / STTR Transfer | | | | | | | - | 0.253 | - | - | - |
| FY 2019 Plans: FY 2019 SBIR / STTR Transfer | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | | | | | | | |
| Accomplishments/Planned Programs Subtotals | | | | | | | - | 6.917 | 8.943 | - | 8.943 |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • E66501: PROJ, 155mm ARTY HE RAP, XM1113 | - | - | 0.000 | 30.000 | 30.000 | 36.000 | 53.000 | - | - | 0.000 | 119.000 |
| Remarks Procurement of Ammunition, Army (PAA) Funding | | | | | | | | | | | |
| D. Acquisition Strategy The XM1113 Project is utilizing four DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives for early development and prototyping: One DOTC OTA will be with General Dynamics Ordnance and Tactical Systems (GD-OTS) at Scranton Army Ammunition Plant (SCAAP) in Scranton, PA for the projectile body, the second with Savit Corporation in Rockaway, NJ to procure multiple small components and conduct the Load, Assemble, and Pack (LAP) with American Ordnance (AO) at Iowa Army Ammunition Plant (IAAP), the third with Northrop Grumman in Plymouth, MN for fuze compatibility efforts, and the fourth with Nammo Talley in Mesa, AZ for the rocket grains. The parts will support test activities in Yuma, Arizona. In FY 2019, the U.S. Government is evaluating a single DOTC OTA to cover the XM1113 system to support the accelerated timeline and Urgent Materiel Release (UMR) of 2,000 projectiles in 3Q FY 2021, as well as the maturation XM1113 to meet Milestone C requirements in FY 2022. The Program will transition to a Federal Acquisition Regulation (FAR) based production contract after Milestone C for Low Rate Initial Production (LRIP) and Full Rate Production (FRP). | | | | | | | | | | | |
| E. Performance Metrics N/A | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | Project (Number/Name) EU6 / 155mm HE Rocket Assist Project Extended Range | | | |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| XM1113 Program Management | Various | Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ | - | - | | 0.190 | Oct 2018 | 0.150 | Oct 2019 | - | | 0.150 | 0.000 | 0.340 | - |
| Subtotal | | | | - | | 0.190 | | 0.150 | | - | | 0.150 | 0.000 | 0.340 | N/A |
| Remarks Program Management support includes XM1113 travel and milestone documentation support. | | | | | | | | | | | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| XM1113 HE-RAP Prototyping | MIPR | DoD Ordnance Technology Consortium (DOTC) : Various | - | - | | 1.874 | Nov 2018 | 5.688 | Nov 2019 | - | | 5.688 | 17.000 | 24.562 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.253 | | - | | - | | - | 0.000 | 0.253 | - |
| Subtotal | | | | - | | 2.127 | | 5.688 | | - | | 5.688 | 17.000 | 24.815 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| XM1113 Engineering Support | MIPR | Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | - | | 4.000 | Oct 2018 | 1.750 | Oct 2019 | - | | 1.750 | 11.400 | 17.150 | - |
| Subtotal | | | | - | | 4.000 | | 1.750 | | - | | 1.750 | 11.400 | 17.150 | N/A |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|------------------------|--|-------------|---------|------------|--|------------|--------------|------------|--|------------|------------------|------------------|------------|--------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EU6 / 155mm HE Rocket Assist Project Extended Range | | | | | |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| XM1113 Testing | MIPR | Army Research Lab (ARL) : Adelphi, MD | - | - | | 0.600 | Mar 2020 | - | | - | | - | 0.000 | 0.600 | - |
| XM1113 Testing | MIPR | Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ | - | - | | - | | 1.355 | Mar 2020 | - | | 1.355 | 9.500 | 10.855 | - |
| Subtotal | | | - | - | | 0.600 | | 1.355 | | - | | 1.355 | 9.500 | 11.455 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | - | | 6.917 | | 8.943 | | - | | 8.943 | 37.900 | 53.760 | N/A |
| Remarks | | | | | | | | | | | | | | | |
| In FY 2018, PE 604802A, Project EU7 Enhanced Lethality Cannon Munitions received \$5.100M as part of the FY 2018 OMNIBUS in support of the acceleration of XM1113 High Explosive Rocket Assisted Projectile (HE-RAP) fuze compatibility and prototyping efforts to support the Army's modernization priorities in support of the National Defense Strategy. | | | | | | | | | | | | | | | |
| FY 2019 funding in the amount of \$26.300M from Project 613, MORTAR SYSTEMS, was realigned to Project EU6, 155mm HE Rocket Assist project Extended Range. Both Projects are within the 0604802A Program Element. This funding will be utilized to complete XM1113 lethality testing, firing tables software updates, development of fuze integration efforts, and development of prototype hardware for qualification in support of the Urgent Material Release of 2,000 projectiles in FY 2021 to support the Army's modernization priorities in support of the National Defense Strategy. | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) EU6 / 155mm HE Rocket Assist Project Extended Range | |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| XM1113 Engineering Manufacturing and Development (EMD) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1113 Lethality Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1113 Urgent Materiel Release (UMR) Qualification Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1113 UMR | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1113 Milestone C Qualification Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1113 Milestone C | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1113 Full Materiel Release (FMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|--|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EU6 / <i>155mm HE Rocket Assist Project Extended Range</i> | |

Schedule Details

| Events | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| XM1113 Engineering Manufacturing and Development (EMD) | 3 | 2019 | 4 | 2022 |
| XM1113 Lethality Testing | 1 | 2019 | 1 | 2020 |
| XM1113 Urgent Materiel Release (UMR) Qualification Testing | 3 | 2019 | 2 | 2020 |
| XM1113 UMR | 3 | 2021 | 3 | 2021 |
| XM1113 Milestone C Qualification Testing | 1 | 2021 | 3 | 2022 |
| XM1113 Milestone C | 4 | 2022 | 4 | 2022 |
| XM1113 Full Materiel Release (FMR) | 4 | 2023 | 4 | 2023 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EU7: Enhanced Lethality Cannon Munitions | - | 25.600 | 7.905 | 7.908 | - | 7.908 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 41.413 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

In FY 2018, Program Element 0604802A, Project EU7 Enhanced Lethality Cannon Munitions received \$5.100 million as part of the FY 2018 OMNIBUS Prior Approval Above Threshold Reprogramming (FY 18-17 PA) in support of the acceleration of XM1113 High Explosive Rocket Assisted Projectile (HE-RAP) fuze compatibility and prototyping efforts to support the Army's modernization priorities in support of the National Defense Strategy.

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 supports testing and assessment of the Israeli Military Industries (IMI) Systems M999 advanced anti-personnel munition and also accelerates the qualification of the 155mm XM1128 High Explosive Projectile including the evaluation of Lithographic Fragmentation Technology (LFT); both of these initiatives support the Army Directed Requirement for a Rapid Bridging Solution for the replacement of the 155mm Dual Purpose Improved Conventional Munition (DPICM). FY 2020 funds will support fuze performance evaluation and confirmation with XM1128, as well as continued Insensitive Munitions (IM) testing, Sequential Environmental Test - Safety (SET-S), and Military Standard Environmental Engineering Considerations and Laboratory Tests (MIL-STD-810). Engineering efforts will support the evaluation of the XM1128 test data to determine that the Program is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C in FY 2021.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: 155mm XM1128 High Explosive Projectile | 18.027 | 7.615 | 7.908 | - | 7.908 |
| Description: Evaluate, Develop, and Qualify Enhanced Lethality Technologies. | | | | | |
| FY 2019 Plans: FY 2019 supports the completion of the Product Qualification Testing (PQT) test series for the XM1128 and the finalization of the Capability Production Document (CPD) by 4Q FY 2019. | | | | | |
| FY 2020 Base Plans: FY 2020 funds will support fuze performance evaluation and confirmation with XM1128, as well as continued Insensitive Munitions (IM) testing, Sequential Environmental Test - Safety (SET-S), and Military Standard environmental testing (MIL-STD-810). Engineering efforts will support the evaluation of the XM1128 test data to | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|---|----------------|---|---------------------|---|----------------------|----------------------|----------------|----------------|----------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | | | | | | | |
| 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 | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | | | | |
| | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | | | | | |
| determine that the Program is safe, suitable and operationally effective, as well as the gathering of all statutory and regulatory requirements in support of a Milestone C in FY 2021. | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: N/A | | | | | | | | | | | |
| Title: 155mm M999 IMI Projectile with M99 Submunitions | | 2.473 | - | - | - | - | | | | | |
| Description: M999 testing assessment of performance, safety, and unexploded ordnance (UXO) rates. | | | | | | | | | | | |
| Title: 155mm XM1113 High Explosive Rocket Assisted Projectile | | 5.100 | - | - | - | - | | | | | |
| Description: Evaluate, Develop, and Qualify Enhanced Lethality Technologies. | | | | | | | | | | | |
| Title: FY 2019 SBIR / STTR Transfer | | - | 0.290 | - | - | - | | | | | |
| FY 2019 Plans: FY 2019 SBIR / STTR Transfer | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | | | | | | | |
| Accomplishments/Planned Programs Subtotals | | 25.600 | 7.905 | 7.908 | - | 7.908 | | | | | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • E67802: PROJ, 155mm ARTY HE-BB, XM1128 | - | - | 0.000 | 14.994 | 14.994 | 34.503 | 50.240 | 119.781 | 128.366 | 0.000 | 347.884 |
| Remarks Procurement of Ammunition, Army (PAA) Funding | | | | | | | | | | | |
| D. Acquisition Strategy The XM1128 High Explosive munition has been accelerated for qualification, per the Army Directed Requirement for a Rapid Bridging Solution for the 155mm Dual Purpose Improved Conventional Munition (DPICM) as of 22 December 2016, as an inherent part of the Rapid Bridging solution for 155mm DPICM. Prototyping was awarded in 1Q FY 2018 through DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) initiatives to multiple vendors (subcontractors to U.S. Government system integrator) through Engineering & Manufacturing Development (EMD). The U.S. Government will lead EMD efforts to complete development | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
| 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> |
| <p>by end 4Q FY 2020. Milestone C approval is in 2Q FY 2021. Following Milestone C, the XM1128 will be competed via Federal Acquisition Regulation (FAR) based contracts for Load, Assemble, and Pack (LAP) and metal parts in support of Low Rate Initial Production (LRIP) and follow-on production activities. Full Material Release (FMR) is planned for 1Q FY 2022.</p> <p><u>E. Performance Metrics</u> N/A</p> | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| ELCM Program Management | Various | Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ | - | 0.347 | Oct 2017 | 0.140 | Oct 2018 | 0.150 | Oct 2019 | - | | 0.150 | 0.000 | 0.637 | - |
| Subtotal | | | - | 0.347 | | 0.140 | | 0.150 | | - | | 0.150 | 0.000 | 0.637 | N/A |
| Remarks Program Management support includes XM1128 and M999 travel and milestone documentation support. | | | | | | | | | | | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 PQT Hardware | MIPR | DoD Ordnance Technology Consortium (DOTC) : Various | - | 10.074 | Nov 2017 | 3.054 | Feb 2019 | 1.875 | Oct 2019 | - | | 1.875 | 0.140 | 15.143 | - |
| XM1113 Prototype Hardware | MIPR | DoD Ordnance Technology Consortium (DOTC) : Various | - | 4.494 | Oct 2018 | - | | - | | - | | - | 0.000 | 4.494 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.290 | | - | | - | | - | 0.000 | 0.290 | - |
| Subtotal | | | - | 14.568 | | 3.344 | | 1.875 | | - | | 1.875 | 0.140 | 19.927 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 Engineering Support | MIPR | Armament Reasech Development and Engineering Center | - | 5.294 | Nov 2017 | 1.032 | Mar 2019 | 4.283 | Oct 2019 | - | | 4.283 | 1.377 | 11.986 | - |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| | | (ARDEC) : Picatinny Arsenal, NJ | | | | | | | | | | | | | |
| XM1128 Firing Table Software Updates | MIPR | Armament Research Development and Engineering Center (ARDEC) : Adelphi, MD | - | 2.123 | Feb 2019 | - | | - | | - | | - | 0.000 | 2.123 | - |
| M999 Engineering Support | MIPR | Armament Reasech, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | 0.750 | Jun 2018 | - | | - | | - | | - | 0.000 | 0.750 | - |
| XM1113 Engineering Support | MIPR | Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | 0.606 | Oct 2018 | - | | - | | - | | - | 0.000 | 0.606 | - |
| Subtotal | | | - | 8.773 | | 1.032 | | 4.283 | | - | | 4.283 | 1.377 | 15.465 | N/A |
| Remarks FY 2020: Additional XM1128 Engineering Support in FY 2020 required to facilitate individual Production Qualification Testing (PQT) events, reviews, and Milestone C preparation | | | | | | | | | | | | | | | |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 Testing | MIPR | Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ | - | - | | 1.891 | Mar 2019 | 1.250 | Mar 2020 | - | | 1.250 | 0.000 | 3.141 | - |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|------------------------|---|-------------|---------|------------|--|------------|--------------|------------|-------------|------------|--|------------------|------------|--------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 Testing | MIPR | Naval Surface Warfare Center (NSWC) ? Dahlgren : Dahlgren, VA | - | - | | 0.898 | Nov 2018 | - | | - | | - | 0.000 | 0.898 | - |
| XM1128 Testing | MIPR | National Technical Systems (NTS) : Camden, AR | - | 0.067 | May 2018 | 0.600 | Jan 2019 | 0.350 | Mar 2020 | - | | 0.350 | 0.000 | 1.017 | - |
| M999 Testing | MIPR | Combating Terrorism Technical Support Office (CTTSO) : Alexandria, VA | - | 1.770 | Sep 2018 | - | | - | | - | | - | 0.000 | 1.770 | - |
| XM1128 Testing | MIPR | Army Research Lab (ARL) : Adelphi, MD | - | 0.075 | May 2018 | - | | - | | - | | - | 0.000 | 0.075 | - |
| Subtotal | | | - | 1.912 | | 3.389 | | 1.600 | | - | | 1.600 | 0.000 | 6.901 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | 25.600 | | 7.905 | | 7.908 | | - | | 7.908 | 1.517 | 42.930 | N/A |
| Remarks | | | | | | | | | | | | | | | |
| FY 2018: \$5.100M received as part of the FY 2018 OMNIBUS in support of the acceleration of XM1113 High Explosive Rocket Assisted Projectile (HE-RAP) fuze compatibility and prototyping efforts to support the Army's modernization priorities in support of the National Defense Strategy. | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 | |

| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 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 |
| XM1128 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Prototyping | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Milestone B | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Lethality Testing and Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Critical Design Review (CDR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Performance Qualification Testing (PQT) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Baseline Prototyping | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Milestone C | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XM1128 Full Materiel Release (FMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M999 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M999 Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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 | |

Schedule Details

| Events | Start | | End | |
|--|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| XM1128 | 3 | 2017 | 1 | 2021 |
| XM1128 Prototyping | 3 | 2017 | 4 | 2019 |
| XM1128 Milestone B | 1 | 2018 | 1 | 2018 |
| XM1128 Lethality Testing and Assessment | 4 | 2017 | 4 | 2019 |
| XM1128 Critical Design Review (CDR) | 2 | 2019 | 2 | 2019 |
| XM1128 Performance Qualification Testing (PQT) | 2 | 2019 | 3 | 2020 |
| XM1128 Baseline Prototyping | 4 | 2019 | 3 | 2020 |
| XM1128 Milestone C | 2 | 2021 | 2 | 2021 |
| XM1128 Full Materiel Release (FMR) | 1 | 2023 | 1 | 2023 |
| M999 | 4 | 2018 | 4 | 2019 |
| M999 Testing | 4 | 2018 | 4 | 2019 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|------------|
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EU8: Improved Multi-Option Fuze | - | 9.730 | 7.905 | 10.000 | - | 10.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 27.635 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

FY 2020 funding increase supports the Army's modernization priorities in support of the National Defense Strategy.

A. Mission Description and Budget Item Justification

The Improved Multi-Option Fuze Project (MOFA II/iMOFM) is a technology refresh and modernization effort that provides an incremental capability with technology advancements and performance improvements on the current non-precision artillery and mortar ammunition proximity multi-option fuzes that will increase robustness to electronic countermeasures (ECM), eliminates the susceptibility of reverse engineering (RE), incorporates power source advancements, improves delay mode reliability, and integrates safe & arm improvements. This will develop and qualify safe, affordable, reliable Proximity Height of Burst (HoB) fuzing solutions with robust Defense Exportability Features (DEF) for non-precision conventional Cannon artillery and Mortar munitions that are resistant to adversary exploitation via electronic countermeasures and reverse engineering threats. FY 2020 will support the preparation and incrementing of Engineering and Manufacturing Development (EMD) contracts, the fabrication of MOFA II and iMOFM hardware to conduct developmental verification tests and Product Qualification Tests (PQT), the iMOFM Critical Design Review (CDR), and the preparations for transition into production.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Improved Multi-Option Fuze Development | 9.730 | 7.615 | 10.000 | - | 10.000 |
| Description: Develop and qualify improved multi-option fuze technologies. | | | | | |
| FY 2019 Plans: FY 2019 is supporting the preparation and award of EMD contract utilizing the DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) for preliminary iMOFM design and detailed MOFA II design, the fabrication of hardware and conducting of development verification tests, the preparations for and execution of an iMOFM Preliminary Design Review (PDR) and MOFA II Critical Design Review (CDR), and the completion of MOFA II Product Qualification (PQT) plans and the fabrication of test hardware. | | | | | |
| FY 2020 Base Plans: FY 2020 funding will support the EMD contract increments utilizing the DOTC OTA for MOFA II detailed designs, the fabrication of hardware and the execution of MOFA II Product Qualification Tests (PQT), ballistic engineering | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|---------|---------|--------------|--|---------------|---------|---------|---|---------|------------------|-------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | Date: March 2019 | | | | |
| 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 | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| and qualification testing, iMOFM developmental verification tests, iMOFM Critical Design Review, the execution of iMOFM PQT and the preparations for transition into production. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 increase supports the test assets required for both execution of Production Qualification Testing (PQT) and Development Verification Testing (DVT). | | | | | | | | | | | | |
| Title: FY 2019 SBIR / STTR Transfer | | | | | | | | - | 0.290 | - | - | - |
| FY 2019 Plans: FY 2019 SBIR / STTR Transfer | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | | | | | | | | | | |
| Accomplishments/Planned Programs Subtotals | | | | | | | | 9.730 | 7.905 | 10.000 | - | 10.000 |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost | |
| • E99909: Multi-Option Fuze, Artillery M782 | - | - | 0.000 | 2.700 | 2.700 | 16.250 | 32.500 | - | - | 0.000 | 51.450 | |
| Remarks | | | | | | | | | | | | |
| Budget Activity (BA) 4, Program Element (PE) 0603639A Project EU2: Improved Multi-Option Fuze (MOFA II/iMOFM) - FY 2017 \$7.588 million Project was transitioned in FY 2018 to BA5 PE 0604802A Project EU8: Improved Multi-Option Fuze (MOFA II/iMOFM). | | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | | |
| The Improved Multi-Option Fuze Project will utilize the DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) with incrementally funded Engineering and Manufacturing Development (EMD) contracts for improved and modernized MOFA II detailed designs and the fabrication of hardware. Improved Multi-Option Fuze programs of record via subsequent Engineering and Manufacturing 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 to facilitate competitive Federal Acquisition Regulation (FAR) based contracting for procurement. Qualified MOFA II will be a Technology Readiness Level 8 (TRL-8) TC design with a mature technical design packages 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 | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Program Management | Various | Office of the Project Manager (PM) Combat Ammunition Systems (CAS) : Picatinny Arsenal, NJ | - | 0.898 | May 2018 | 0.200 | Nov 2018 | 0.300 | Nov 2019 | - | | 0.300 | 0.000 | 1.398 | - |
| Subtotal | | | - | 0.898 | | 0.200 | | 0.300 | | - | | 0.300 | 0.000 | 1.398 | N/A |
| Remarks Program management supports travel and Milestone C documentation. | | | | | | | | | | | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Improved Multi-Option Fuze Development and Component Prototypes | MIPR | DoD Ordnance Technology Consortium (DOTC) - TBD : Various | - | 6.278 | Oct 2017 | - | | - | | - | | - | 0.000 | 6.278 | - |
| Improved Multi-Option Fuze Test Hardware & PQT Support | MIPR | DoD Ordnance Technology Consortium (DOTC) - TBD : Various | - | - | | 5.200 | Apr 2019 | 3.000 | Mar 2020 | - | | 3.000 | 0.000 | 8.200 | - |
| MOFA II Fuze Test Hardware & PQT Support | MIPR | DoD Ordnance Technology Consortium (DOTC) - TBD : Various | - | - | | 0.300 | Jun 2019 | 3.800 | Jun 2020 | - | | 3.800 | 0.000 | 4.100 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.290 | | - | | - | | - | 0.000 | 0.290 | - |
| Subtotal | | | - | 6.278 | | 5.790 | | 6.800 | | - | | 6.800 | 0.000 | 18.868 | N/A |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Engineering Support | MIPR | Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | 1.551 | Oct 2017 | 0.869 | Nov 2018 | 1.025 | Nov 2019 | - | | 1.025 | 0.000 | 3.445 | - |
| Subtotal | | | - | 1.551 | | 0.869 | | 1.025 | | - | | 1.025 | 0.000 | 3.445 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Improved Multi-Option Fuze Test and Evaluations | MIPR | Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | - | 0.666 | Oct 2017 | 0.300 | Nov 2018 | 0.500 | Nov 2019 | - | | 0.500 | 0.000 | 1.466 | - |
| Improved Multi-Option Fuze Test and Evaluations | MIPR | Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ | - | 0.187 | May 2018 | 0.596 | Jun 2019 | 1.300 | Jun 2020 | - | | 1.300 | 0.000 | 2.083 | - |
| Improved Multi-Option Fuze Test and Evaluations | MIPR | U.S. Army Research Lab (ARL) : Adelphi, MD | - | 0.150 | Oct 2017 | 0.150 | Nov 2018 | 0.075 | Nov 2019 | - | | 0.075 | 0.000 | 0.375 | - |
| Subtotal | | | - | 1.003 | | 1.046 | | 1.875 | | - | | 1.875 | 0.000 | 3.924 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | 9.730 | | 7.905 | | 10.000 | | - | | 10.000 | 0.000 | 27.635 | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------|---|---|---|---------|---|---|---|---------|--|---|---|---------|---|---|------------------|---------|---|---|---|---------|---|---|---|---------|---|---|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | | | | | | | | | | | | | | Date: March 2019 | | | | | | | | | | | | | |
| 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 | | | | | | | | | |
| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | | |
| | 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 | |
| Fabricate Prototypes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conduct Evaluations and Design Reviews | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fabricate System Level Qualification Hardware | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Safety, Reliability, Environmental, EMD and Qualification Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / <i>Weapons and Munitions - Eng Dev</i> | Project (Number/Name) EU8 / <i>Improved Multi-Option Fuze</i> | |

Schedule Details

| Events | Start | | End | |
|---|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| Fabricate Prototypes | 3 | 2018 | 3 | 2019 |
| Conduct Evaluations and Design Reviews | 2 | 2019 | 4 | 2019 |
| Fabricate System Level Qualification Hardware | 3 | 2019 | 3 | 2020 |
| Safety, Reliability, Environmental, EMD and Qualification Testing | 2 | 2020 | 4 | 2020 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EW1 / 40mm Low Velocity Ammunition | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| EW1: 40mm Low Velocity Ammunition | - | 13.469 | 13.253 | 14.032 | - | 14.032 | 17.402 | 5.963 | 2.000 | 0.000 | 0.000 | 66.119 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

A. Mission Description and Budget Item Justification

The 40mm Low Velocity 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 Low Velocity HEAB tactical cartridge allows the warfighter to engage targets at increased effective ranges using the 40mm M320 Grenade Launcher. 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. When deployed against point and area targets, the cartridge inflicts incapacitating effects against personnel 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 2020 will support Design Engineering Test (DET) 2 and DET 3 build, Soldier Touch Point (Limited User Evaluation), Test Readiness Reviews (TRRs) and DET 2 Testing.

The 40mm Low Velocity (LV) Door Breach (DB), XM1167, cartridge allows the grenadier to conduct a ballistic breach of an existing door to create an entry point into a building or other structure. This capability is critical during Urban Operations, 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 Door Breach cartridge will provide the small unit with the capability to conduct efficient breaching operations; allowing the Warfighter to create an entry point into a structure for an assault element to enter and begin clearing operations, one of the most difficult types of operations that Soldiers may face in an urban environment. The 40mm Door Breach cartridge will reduce collateral damage and friendly casualties associated with breaching operations. The deployment of 40mm Dor Breach cartridges will enable the small unit to gain and maintain a tactical advantage through efficiency of combat power and momentum. No funding requested in FY 2020.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| Title: 40mm Low Velocity High Explosive Air Burst (HEAB), XM1166 | 9.291 | 12.767 | 14.032 | - | 14.032 |
| Description: Engineering Manufacturing Development (EMD) of the 40mm Low Velocity, High Explosive Airburst (HEAB) munition. | | | | | |
| FY 2019 Plans: FY 2019 activities include awarding two development contracts for competing prototyping, a Low Velocity-High Explosive Air Burst (LV-HEAB) Preliminary Design Review (PDR), a Test Readiness Review (TRR), Design Engineering Test (DET 1) build and DET 1 Testing. | | | | | |
| FY 2020 Base Plans: | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|--|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | Date: March 2019 | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) EW1 / 40mm Low Velocity Ammunition | |

| | | | | | |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| B. Accomplishments/Planned Programs (\$ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| FY 2020 Engineering and Manufacturing Development (EMD) activities will include Test Readiness Reviews (TRRs), Design Engineering Test (DET) hardware build, DET 2 testing, a Limited User Evaluation (LUE), and DET 3 hardware build. | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: Increase due to continued 40mm Low Velocity High Explosive Air Burst (HEAB) development. | | | | | |
| Title: 40mm Low Velocity Door Breach (DB), XM1167 Description: Conduct limited qualification testing to mature technology and manufacturing readiness. | 4.178 | - | - | - | - |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | - | 0.486 | - | - | - |
| Accomplishments/Planned Programs Subtotals | 13.469 | 13.253 | 14.032 | - | 14.032 |

| | | | | | | | | | | | |
|---|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • E71005: CTG, 40mm LV, IRAP | - | - | 0.000 | - | 0.000 | - | 11.601 | 13.594 | 14.500 | 0.000 | 39.695 |
| Remarks | | | | | | | | | | | |
| D. Acquisition Strategy The HEAB cartridge will be developed through a competitive Engineering and Manufacturing Development (EMD) program. Evaluate potential designs as part of the pre-EMD activities using a Cooperative Research and Development Agreement (CRADA) with contractors to completed testing. For EMD, the Government anticipates awarding two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC). The EMD phase will consist of a series of Design Engineering Tests (DETs) to assess the Contractors' design progress and ability of achieving the program objectives. Any shortcomings and deficiencies will be addressed prior to final Developmental Test & Evaluation (DT&E). After DT&E and a successful Milestone C, the government will down-select to a single contractor for Low Rate Initial Production (LRIP) and four production year options utilizing a follow-on Federal Acquisition Regulation (FAR) based contract. | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|--|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) EW1 / 40mm Low Velocity Ammunition |
| The Door Breach cartridge development will consist of characterization testing of multiple designs provided by industry which will be used to further inform a potential future requirement. | | |
| E. Performance Metrics N/A | | |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|--|------------------------|---|-------------|---------|------------|--|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EW1 / 40mm Low Velocity Ammunition | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| LV HEAB XM1166 Project Manager Maneuver Ammunition Systems (PM MAS) | Various | Picatinny Arsenal : NJ | - | 0.241 | Nov 2017 | - | | - | | - | | - | 0.000 | 0.241 | - |
| LV HEAB XM1166 Contractor 1 | C/CPFF | Day & Zimmerman, Inc (DZI) : Middletown, IA | - | 3.900 | Sep 2018 | 5.243 | Jan 2019 | 5.716 | Oct 2019 | - | | 5.716 | Continuing | Continuing | Continuing |
| LV HEAB XM1166 Contractor 2 | C/CPFF | Chemring Ordnance, Inc : Perry, FL | - | 3.900 | Sep 2018 | 5.243 | Jan 2019 | 5.716 | Oct 2019 | - | | 5.716 | Continuing | Continuing | Continuing |
| LV Door Breach XM1167 Testing Contractor 1 | C/CPFF | ATI : Arlington, VA | - | 0.842 | Nov 2018 | - | | - | | - | | - | 0.000 | 0.842 | - |
| LV Door Breach XM1167 Testing Contractor 2 | C/CPFF | ATI : Arlington, VA | - | 0.842 | Nov 2018 | - | | - | | - | | - | 0.000 | 0.842 | - |
| LV Door Breach XM1167 Testing Contractor 3 | C/CPFF | ATI : Arlington, VA | - | 0.842 | Nov 2018 | - | | - | | - | | - | 0.000 | 0.842 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.486 | | - | | - | | - | 0.000 | 0.486 | - |
| Subtotal | | | - | 10.567 | | 10.972 | | 11.432 | | - | | 11.432 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| LV HEAB XM1166 Armament Research Development Engineering Center (ARDEC) | MIPR | Picatinny Arsenal : NJ | - | 1.250 | Nov 2017 | 1.300 | Nov 2018 | 1.350 | Oct 2019 | - | | 1.350 | Continuing | Continuing | Continuing |
| LV Door Breach XM1167 Armament Research Development Engineering Center (ARDEC) | MIPR | Picatinny Arsenal : NJ | - | 0.902 | Jan 2018 | - | | - | | - | | - | 0.000 | 0.902 | - |
| Subtotal | | | - | 2.152 | | 1.300 | | 1.350 | | - | | 1.350 | Continuing | Continuing | N/A |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--|-------------------|----------------------|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) EW1 / 40mm Low Velocity Ammunition | | | | | |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| LV HEAB XM1166 Design Engineering Test (DET) 1 | MIPR | Aberdeen Test Center (ATC) : Aberdeen, MD | - | - | | 0.981 | May 2019 | - | | - | | - | 0.000 | 0.981 | - |
| LV HEAB XM1166 Design Engineering Test (DET) 2 | MIPR | Aberdeen Test Center (ATC) : Aberdeen, MD | - | - | | - | | 1.250 | Feb 2020 | - | | 1.250 | 0.000 | 1.250 | - |
| LV Door Breach XM1167 Testing and Materials | MIPR | Aberdeen Test Center (ATC) : Aberdeen, MD | - | 0.750 | May 2018 | - | | - | | - | | - | 0.000 | 0.750 | - |
| Subtotal | | | - | 0.750 | | 0.981 | | 1.250 | | - | | 1.250 | 0.000 | 2.981 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | 13.469 | | 13.253 | | 14.032 | | - | | 14.032 | Continuing | Continuing | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

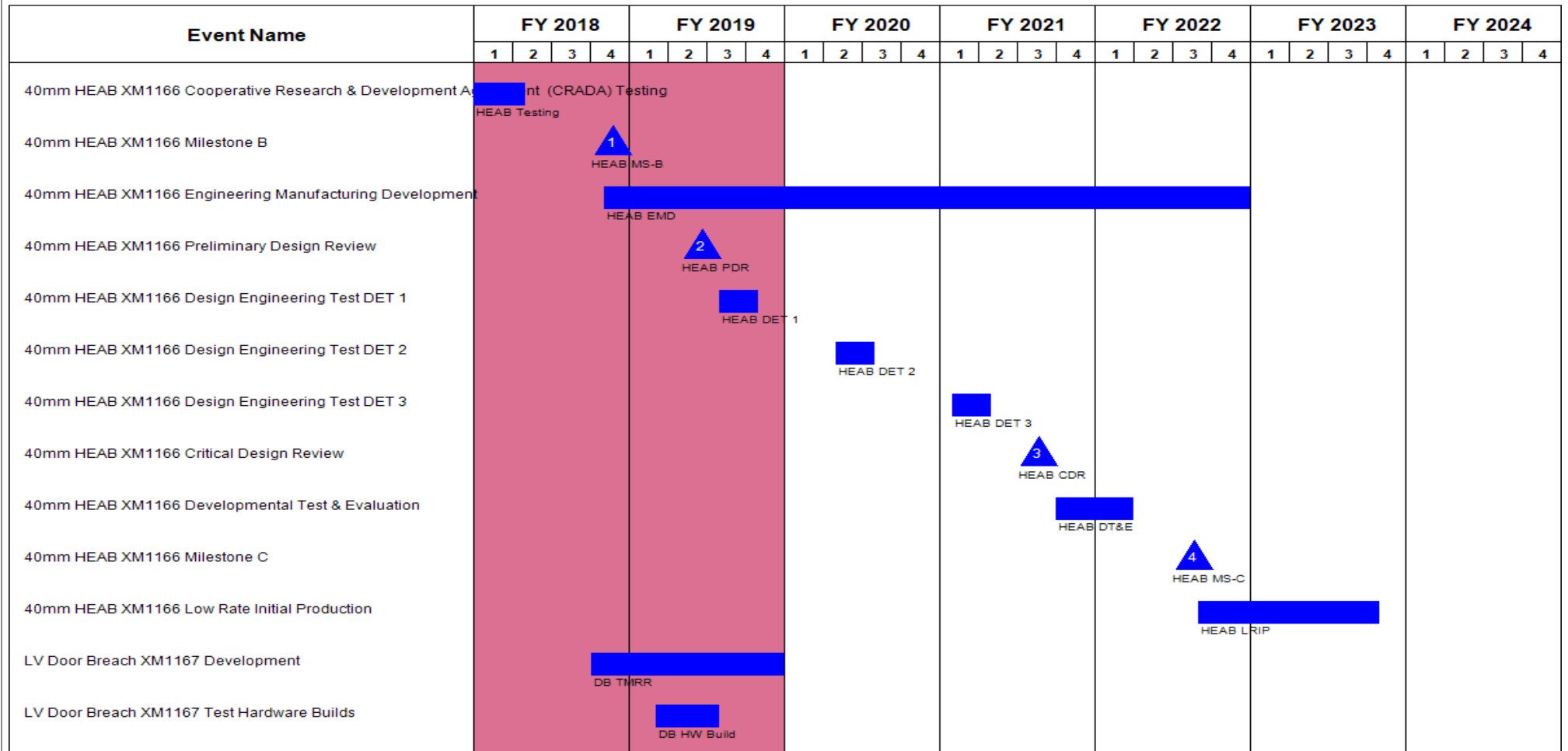
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army

Date: March 2019

Appropriation/Budget Activity
2040 / 5

R-1 Program Element (Number/Name)
PE 0604802A / Weapons and Munitions -
Eng Dev

Project (Number/Name)
EW1 / 40mm Low Velocity Ammunition



UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------|---|---|---|---------|---|---|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | | | | | | | | | | | | | | Date: March 2019 | | | | | | | | | | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | | | Project (Number/Name) EW1 / 40mm Low Velocity Ammunition | | | | | | | | | | | | |
| Event Name | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
| | 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 |
| LV Door Breach XM1167 Testing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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 Low Velocity Ammunition</i> | |

Schedule Details

| Events | Start | | End | |
|---|----------------|-------------|----------------|-------------|
| | Quarter | Year | Quarter | Year |
| 40mm HEAB XM1166 Cooperative Research & Development Agreement (CRADA) Testing | 3 | 2017 | 1 | 2018 |
| 40mm HEAB XM1166 Milestone B | 4 | 2018 | 4 | 2018 |
| 40mm HEAB XM1166 Engineering Manufacturing Development | 4 | 2018 | 4 | 2022 |
| 40mm HEAB XM1166 Preliminary Design Review | 2 | 2019 | 2 | 2019 |
| 40mm HEAB XM1166 Design Engineering Test DET 1 | 3 | 2019 | 4 | 2019 |
| 40mm HEAB XM1166 Design Engineering Test DET 2 | 2 | 2020 | 3 | 2020 |
| 40mm HEAB XM1166 Design Engineering Test DET 3 | 1 | 2021 | 2 | 2021 |
| 40mm HEAB XM1166 Critical Design Review | 3 | 2021 | 3 | 2021 |
| 40mm HEAB XM1166 Developmental Test & Evaluation | 4 | 2021 | 1 | 2022 |
| 40mm HEAB XM1166 Milestone C | 3 | 2022 | 3 | 2022 |
| 40mm HEAB XM1166 Low Rate Initial Production | 3 | 2022 | 4 | 2023 |
| LV Door Breach XM1167 Development | 4 | 2018 | 4 | 2019 |
| LV Door Breach XM1167 Test Hardware Builds | 1 | 2019 | 3 | 2019 |
| LV Door Breach XM1167 Testing | 4 | 2019 | 4 | 2019 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| FA6: 30mm Lethality | - | 13.344 | 13.834 | 22.897 | - | 22.897 | 15.860 | 9.797 | 8.000 | 3.000 | 0.000 | 86.732 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| A. Mission Description and Budget Item Justification | | | | | | | | | | | | |
| The 30mm Lethality project funds the development of a suite of 30x173mm caliber cartridges, which includes anti-personnel tactical and training cartridges and anti-materiel tactical and training cartridges, as well as Airburst Munition cartridges for Urgent Materiel Release (UMR) and Full Materiel Release (FMR). The objective is to enhance the operational effectiveness and lethality of the Stryker Infantry Carrier Vehicle (ICV), Next Generation Combat Vehicle (NGCV), 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 light armored vehicles. The training cartridges will be ballistically matched to the tactical cartridges, allowing the Warfighter to train in a cost effective manner. The Airburst munitions will provide the Warfighter with increased lethality against troops in the open, counter defilade and anti-tank guided missiles (ATGM). This project will leverage earlier efforts in support of the Stryker Operational Needs Statement (ONS) for Increased Lethality for the 2nd Calvary Regiment (2CR), United States Army Europe (USAREUR) (HQDA ONS 15-20590). FY 2020 funding will support three Design Engineering Tests (DET) and a Design Verification Test (DVT) for the non-airburst 30x173mm suite of ammunition. FY 2020 will also support Milestone B and Engineering and Manufacturing Development (EMD) contract award for the 30x173mm Airburst munition. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: 30X173mm Non-Airburst Suite of Ammunition | | | | | | | | 5.808 | 3.380 | 17.360 | - | 17.360 |
| Description: Qualify and field a suite of 30x173mm anti-materiel and anti-personnel tactical and training cartridges for use on Stryker Infantry Combat Vehicles (ICV) or other Army Future Fighting Vehicles. | | | | | | | | | | | | |
| FY 2019 Plans: FY 2019 primary activities include completing the hardware build to support Design Engineering Testing (DET) of the suite of 30x173mm ammunition and support the hardware build required for one of the Design Verification Tests (DVT). | | | | | | | | | | | | |
| FY 2020 Base Plans: FY 2020 primary activities include three Design Engineering Tests (DET) and a Design Verification Test (DVT) for the non-airburst 30x173mm suite of ammunition. FY 2020 will also support the hardware build required for the remaining three DVTs scheduled for FY 2021. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | |
|--|--|---|------------------|--------------|-------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) FA6 / 30mm Lethality | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Increase due to the ramp up of Design Engineering Testing (DET) and the hardware required to support Design Verification Testing (DVT). | | | | | | |
| Title: 30x173mm High Explosive Airburst - Tracer (HEAB-T) Description: Develop, qualify, and field a 30x173mm Airburst capable cartridge for use on Stryker Infantry Combat Vehicles (ICV), Next Generation Combat Vehicles (NGCV), or other Army Future Fighting Vehicles. FY 2019 Plans: FY 2019 primary activities include the continued development of the 30x173mm Airburst technology and the completion of software, fire control, and integration testing. FY 2020 Base Plans: FY 2020 primary activities include a Milestone B decision and awards up to two contractors to support Engineering, Manufacturing, and Development (EMD). FY 2019 to FY 2020 Increase/Decrease Statement: Decrease to do a decrease in technology development to be followed by an increase for EMD. | | 6.525 | 9.830 | 5.537 | - | 5.537 |
| Title: 30x173mm Programmable Airburst Munitions (PABM) Urgent Materiel Release (UMR) Description: Qualify and field the 30x173mm MK310 Programmable Air Burst munition with Tracer (PABM-T) ammunition to support the increased lethality for the 2nd Calvary Stryker Regiment directed requirement. FY 2019 Plans: FY 2019 primary activities include the completion of the UMR of the Programmable Air Burst with Tracer (PABM-T) ammunition. FY 2019 to FY 2020 Increase/Decrease Statement: Decrease due to successful completion of urgent materiel release (UMR). | | 1.011 | 0.118 | - | - | - |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | - | 0.506 | - | - | - |
| Accomplishments/Planned Programs Subtotals | | 13.344 | 13.834 | 22.897 | - | 22.897 |

UNCLASSIFIED

| | | | |
|--|--|--|-------------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) FA6 / 30mm Lethality | |

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

| <u>Line Item</u> | <u>FY 2018</u> | <u>FY 2019</u> | <u>FY 2020</u> <u>Base</u> | <u>FY 2020</u> <u>OCO</u> | <u>FY 2020</u> <u>Total</u> | <u>FY 2021</u> | <u>FY 2022</u> | <u>FY 2023</u> | <u>FY 2024</u> | <u>Cost To</u> <u>Complete</u> | <u>Total Cost</u> |
|--|----------------|----------------|-------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------|----------------|-----------------------------------|-------------------|
| • E07610: CTG, 30MM, Progrmabl Air Burst Mun, Mk310, Linked | - | 1.765 | 0.000 | 14.546 | 14.546 | 14.565 | 15.509 | 15.497 | 15.000 | 0.000 | 76.882 |
| • E07306: CTG, 30mm TP-T, MK239, Single | 14.550 | 3.000 | 0.000 | 10.870 | 10.870 | 3.000 | 11.188 | 3.000 | 4.206 | 0.000 | 49.814 |
| • E07406: CTG, 30mm Hi Expl Incendry-T(HEI-T), Mk238 Series | 14.450 | 12.674 | 0.000 | 10.976 | 10.976 | 6.000 | 10.000 | 10.000 | 10.100 | 0.000 | 74.200 |
| • E09191: CTG, 30mm TPDS- T, MK317 (SABOT Trng), Single | 15.000 | 15.123 | 0.000 | 4.000 | 4.000 | 15.619 | - | 11.621 | 7.713 | 0.000 | 69.076 |
| • E09292: CTG, 30mm APFSDS-T, MK258, Single | 25.500 | 25.447 | 0.000 | 25.232 | 25.232 | 18.952 | 11.900 | 11.900 | 12.020 | 0.000 | 130.951 |

Remarks

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 (XM1170), 30x173mm anti-materiel training cartridge (XM1172), 30x173mm anti-personnel tactical cartridge (XM1171), and 30x173mm anti-personnel training cartridge (XM1173). 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 Engineering Tests (DETs) and Design Verification Tests (DVTs). Based on technical performance, technical maturity, and cost, production contracts may be awarded for each family of cartridges. The objective is to qualify two production sources for each cartridge.

In support of the 30x173mm High Explosive Airburst - Tracer (HEAB-T) cartridge (XM1182), the Government anticipates awarding two contracts utilizing an Other Transaction Agreement (OTA) through Department of Defense (DoD) Ordnance Technology Consortium (DOTC) to support development and design engineering tests. The Government will down-select and award a single contract to complete Developmental Test and Evaluation (DT&E) in support of Milestone C.

E. Performance Metrics

N/A

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|---|------------------------|--|-------------|---------|------------|--|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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) | Various | Picatinny Arsenal : NJ | - | 0.320 | Jan 2018 | - | | - | | - | | - | 0.000 | 0.320 | - |
| High Explosive Airburst (HEAB-T) Development Contract 1 | C/CPFF | General Dynamics - Ordnance and Tactical Systems (GD-OTS) : Marion, IL | - | 2.201 | Feb 2018 | 3.449 | Jan 2019 | - | | - | | - | 0.000 | 5.650 | - |
| High Explosive Airburst (HEAB-T) Development Contract 2 | C/CPFF | Northrop Grumman Information Systems (NGIS) : Plymouth, MN | - | 2.201 | Feb 2018 | 3.449 | Jan 2019 | - | | - | | - | 0.000 | 5.650 | - |
| High Explosive Airburst (HEAB-T) EMD Contract 1 | TBD | TBD : TBD | - | - | | - | | 2.250 | May 2020 | - | | 2.250 | Continuing | Continuing | Continuing |
| High Explosive Airburst (HEAB-T) EMD Contract 2 | TBD | TBD : TBD | - | - | | - | | 2.250 | May 2020 | - | | 2.250 | Continuing | Continuing | Continuing |
| Non-Airburst DET Hardware Contractor 1 | C/CPFF | TBD : TBD | - | 2.060 | Jul 2018 | 0.675 | Feb 2019 | - | | - | | - | 0.000 | 2.735 | - |
| Non-Airburst DET Hardware Contractor 2 | C/CPFF | TBD : TBD | - | 2.060 | Aug 2018 | 0.675 | Feb 2019 | - | | - | | - | 0.000 | 2.735 | - |
| Non-Airburst DVT Hardware Contractor 1 | TBD | TBD : TBD | - | - | | 0.540 | Jun 2019 | 7.200 | Jan 2020 | - | | 7.200 | 0.000 | 7.740 | - |
| Non-Airburst DVT Hardware Contractor 2 | TBD | TBD : TBD | - | - | | 0.540 | Jun 2019 | 7.200 | Jan 2020 | - | | 7.200 | 0.000 | 7.740 | - |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 0.506 | | - | | - | | - | 0.000 | 0.506 | - |
| Subtotal | | | - | 8.842 | | 9.834 | | 18.900 | | - | | 18.900 | Continuing | Continuing | N/A |
| | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | Project (Number/Name) FA6 / 30mm Lethality | | | |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | - | 2.509 | Nov 2017 | 2.550 | Nov 2019 | 2.600 | Oct 2019 | - | | 2.600 | Continuing | Continuing | Continuing |
| Subtotal | | | - | 2.509 | | 2.550 | | 2.600 | | - | | 2.600 | Continuing | Continuing | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Programmable Air Burst Munitions (PABM) Urgent Material Release (UMR) Qualification Testing | MIPR | Aberdeen Test Center (ATC) : Aberdeen, MD | - | 0.511 | Jun 2018 | - | | - | | - | | - | 0.000 | 0.511 | - |
| Non-Airburst Design Engineering Tests (DET) | MIPR | Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD | - | - | | - | | 1.050 | Oct 2019 | - | | 1.050 | 0.000 | 1.050 | - |
| Non-Airburst Design Verification Tests (DVT) | MIPR | Aberdeen Test Center (ATC) : Aberdeen Proving Ground, MD | - | - | | - | | 0.347 | Jul 2020 | - | | 0.347 | Continuing | Continuing | Continuing |
| High Explosive Airburst (HEAB-T) Test Preparations | C/CPFF | Various : Various | - | 1.482 | Nov 2017 | - | | - | | - | | - | 0.000 | 1.482 | - |
| High Explosive Airburst (HEAB-T) Integration and Setter Testing | MIPR | Aberdeen Test Center (ATC) : Aberdeen, MD | - | - | | 1.450 | Jan 2019 | - | | - | | - | 0.000 | 1.450 | - |
| Subtotal | | | - | 1.993 | | 1.450 | | 1.397 | | - | | 1.397 | Continuing | Continuing | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | - | 13.344 | | 13.834 | | 22.897 | | - | | 22.897 | Continuing | Continuing | N/A |

UNCLASSIFIED

| | | | | | | | | | | |
|--|----------------|---------|---------|---|----------------|------------------|---|---------------|--------------------------------|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | Project (Number/Name) FA6 / 30mm Lethality | | | |
| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract | |
| Remarks | | | | | | | | | | |

UNCLASSIFIED

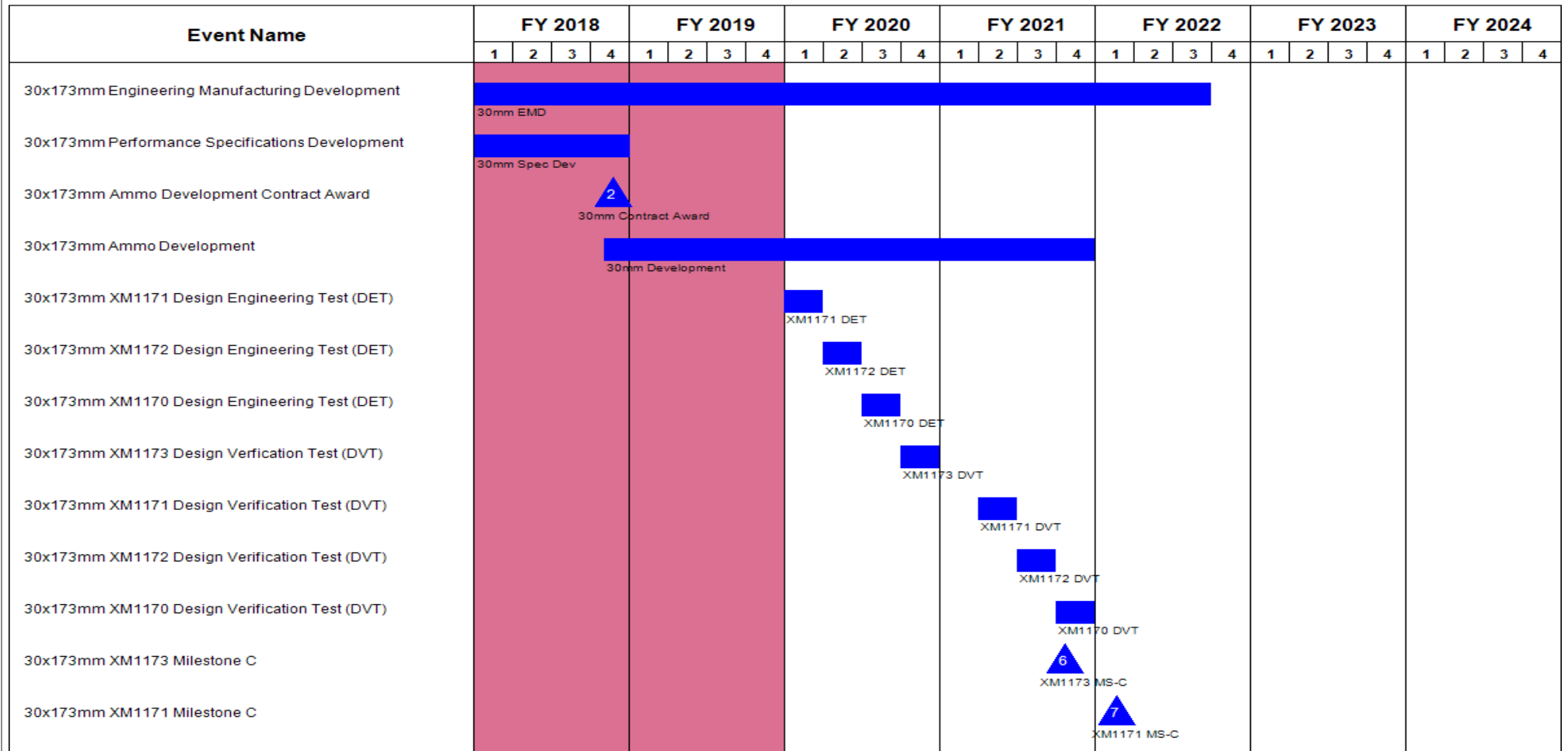
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army

Date: March 2019

Appropriation/Budget Activity
2040 / 5

R-1 Program Element (Number/Name)
PE 0604802A / Weapons and Munitions -
Eng Dev

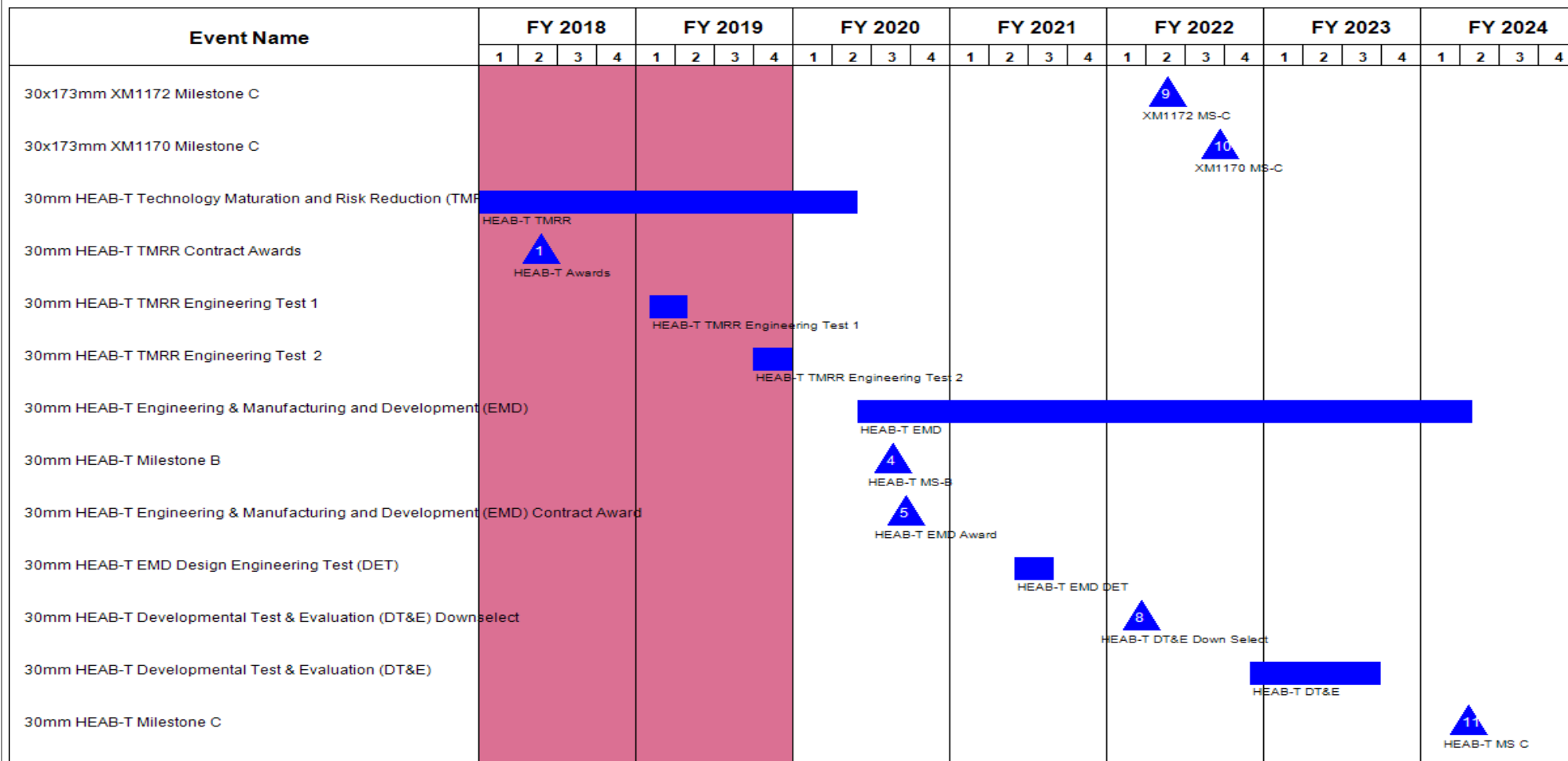
Project (Number/Name)
FA6 / 30mm Lethality



UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army **Date:** March 2019

| | | |
|--|---|--|
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) FA6 / 30mm Lethality |
|--|---|--|



UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|---|---|---|---|---|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|-------------------------------|---|---|---|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | | | | | | | | | | | | | | Date: March 2019 | | | | | | | | | | | | |
| 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 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
| | 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 |
| 30mm HEAB-T Live Fire Test and Evaluation (LFT&E) | <div></div> <div>PABM UMR Qual Build</div> | | | | <div></div> <div>PABM UMR Qual Test</div> <div>3</div> <div>PABM UMR Materiel Release</div> | | | | | | | | | | | | | | | | | | | | <div></div> <div>HEAB-T</div> | | | |
| 30mm HEAB-T Initial Operational Test and Evaluation (IOT&E) | | | | | | | | | | | | | | | | | | | | | | | | | <div></div> <div>HEAB-T</div> | | | |
| Programmable Air Burst Munition UMR Safety Qualification Build | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Programmable Air Burst Munition UMR Safety Qualification Test | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Programmable Air Burst Munition Urgent Materiel Release (UMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|--|--|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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 |
| 30x173mm Engineering Manufacturing Development | 1 | 2018 | 3 | 2022 |
| 30x173mm Performance Specifications Development | 1 | 2018 | 4 | 2018 |
| 30x173mm Ammo Development Contract Award | 4 | 2018 | 4 | 2018 |
| 30x173mm Ammo Development | 4 | 2018 | 4 | 2021 |
| 30x173mm XM1171 Design Engineering Test (DET) | 1 | 2020 | 1 | 2020 |
| 30x173mm XM1172 Design Engineering Test (DET) | 2 | 2020 | 2 | 2020 |
| 30x173mm XM1170 Design Engineering Test (DET) | 3 | 2020 | 3 | 2020 |
| 30x173mm XM1173 Design Verification Test (DVT) | 4 | 2020 | 4 | 2020 |
| 30x173mm XM1171 Design Verification Test (DVT) | 2 | 2021 | 2 | 2021 |
| 30x173mm XM1172 Design Verification Test (DVT) | 3 | 2021 | 3 | 2021 |
| 30x173mm XM1170 Design Verification Test (DVT) | 4 | 2021 | 4 | 2021 |
| 30x173mm XM1173 Milestone C | 4 | 2021 | 4 | 2021 |
| 30x173mm XM1171 Milestone C | 1 | 2022 | 1 | 2022 |
| 30x173mm XM1172 Milestone C | 2 | 2022 | 2 | 2022 |
| 30x173mm XM1170 Milestone C | 3 | 2022 | 3 | 2022 |
| 30mm HEAB-T Technology Maturation and Risk Reduction (TMRR) | 1 | 2018 | 2 | 2020 |
| 30mm HEAB-T TMRR Contract Awards | 2 | 2018 | 2 | 2018 |
| 30mm HEAB-T TMRR Engineering Test 1 | 1 | 2019 | 2 | 2019 |
| 30mm HEAB-T TMRR Engineering Test 2 | 4 | 2019 | 4 | 2019 |
| 30mm HEAB-T Engineering & Manufacturing and Development (EMD) | 2 | 2020 | 2 | 2024 |
| 30mm HEAB-T Milestone B | 3 | 2020 | 3 | 2020 |
| 30mm HEAB-T Engineering & Manufacturing and Development (EMD) Contract Award | 3 | 2020 | 3 | 2020 |

UNCLASSIFIED

| | | | | |
|--|--|------|---|------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 | |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) FA6 / 30mm Lethality | |
| | Start | | End | |
| Events | Quarter | Year | Quarter | Year |
| 30mm HEAB-T EMD Design Engineering Test (DET) | 2 | 2021 | 3 | 2021 |
| 30mm HEAB-T Developmental Test & Evaluation (DT&E) Downselect | 1 | 2022 | 1 | 2022 |
| 30mm HEAB-T Developmental Test & Evaluation (DT&E) | 4 | 2022 | 3 | 2023 |
| 30mm HEAB-T Milestone C | 2 | 2024 | 2 | 2024 |
| 30mm HEAB-T Live Fire Test and Evaluation (LFT&E) | 3 | 2024 | 4 | 2024 |
| 30mm HEAB-T Initial Operational Test and Evaluation (IOT&E) | 3 | 2024 | 4 | 2024 |
| Programmable Air Burst Munition UMR Safety Qualification Build | 4 | 2017 | 3 | 2018 |
| Programmable Air Burst Munition UMR Safety Qualification Test | 4 | 2018 | 1 | 2019 |
| Programmable Air Burst Munition Urgent Materiel Release (UMR) | 2 | 2019 | 2 | 2019 |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|--|------------------|------------------|------------|
| Appropriation/Budget Activity 2040 / 5 | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| FL4: Small Caliber Ammo for Next Gen Squad Weapons | - | 0.000 | 0.000 | 22.880 | - | 22.880 | 30.630 | 28.750 | 25.000 | 11.750 | 0.000 | 119.010 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

In FY 2021, PE 0604802A, Project FL4, Small Caliber Ammo for Next Gen Squad Weapons will be re-aligned to PE 0604601 Project EV9 prior to the PB 2021 submission. The effort is not a new start.

A. Mission Description and Budget Item Justification

The Small Caliber Ammo for Next Gen Squad Weapons project is a critical technology development in response to the Soldier Lethality Cross Functional Team (SL CFT) Initial Capability Document (ICD) for the ammunition required to support the rapid prototyping, development, and fielding of the Next Generation Squad Weapons (NGSW) under Section 804 Authority. The objective is to develop and Full Materiel Release (FMR) the new ammunition. The NGSW ammunition is split into two initial variants, the General Purpose (GP) and the Special Purpose (SP). FY 2020 funding supports continuing rapid prototyping/development of the GP projectile, building prototypes and maturing prototypes to provide to the weapon system contractors for performance evaluation, conducting a Critical Design Review (CDR), and conducting prototype testing. FY 2020 also supports continuing rapid prototyping for the SP projectile, conducting a Preliminary Design Review (PDR), conducting an Initial Product Review (IPR), and performing activities to increase prototype capacity to support planned weapon system testing. Follow-on NGSW ammunition types include: tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition. Development efforts on the follow-on NGSW ammunition variants are scheduled to begin in FY 2022. FY 2020 supports initial activities to evaluate potential solutions/prototypes and concepts to satisfy follow-on NGSW ammunition requirements.

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

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Rapid Prototyping General Purpose (GP) | - | - | 9.152 | - | 9.152 |
| Description: Develop, demonstrate, and qualify new ammunition for the Next Generation Squad Weapon (NGSW) systems. | | | | | |
| FY 2020 Base Plans: FY 2020 efforts are focused on continuing rapid prototyping/development of the GP projectile, building prototypes and maturing prototypes to provide to the weapon system contractors for performance evaluation, conducting a Critical Design Review (CDR), and conducting prototype testing. | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|--|---------|---------|--|-------------|---------------|--|------------------|--------------|-------------|------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | Date: March 2019 | | | | |
| Appropriation/Budget Activity 2040 / 5 | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | |
| The Project transitioned from Program Element (PE) 0604802A, Project EP5, Adv Armor-Piercing (ADVAP). Planned contract awards. | | | | | | | | | | | |
| Title: Rapid Prototyping Special Purpose (SP) Description: Develop, demonstrate, and qualify new ammunition to defeat hard targets for the Next Generation Squad Weapon (NGSW) systems. FY 2020 Base Plans: FY 2020 efforts are focused on continuing Rapid Prototyping for the Special Purpose projectile, conducting a Preliminary Design Review (PDR), conducting an Initial Product Review, and performing activities to increase prototype capacity to support planned weapon system. FY 2019 to FY 2020 Increase/Decrease Statement: The Project transitioned from Program Element (PE) 0604802A, Project EP5, Adv Armor-Piercing (ADVAP). Planned contract awards. | | | | | | - | - | 13.528 | - | 13.528 | |
| Title: Concept Evaluation of other Next Generation of Squad Weapons (NGSW) Ammunition Variants Description: Concept development/evaluation of follow-on variants/ammunition for the Next Generation of Squad Weapons (NGSW). FY 2020 Base Plans: Explore/evaluate ammunition prototypes and concepts of follow-on ammunition for the NGSW. Follow-on NGSW ammunition types include: tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition. FY 2019 to FY 2020 Increase/Decrease Statement: Begin exploring ammunition concepts/solutions to meet follow-on NGSW ammunition requirements. | | | | | | - | - | 0.200 | - | 0.200 | |
| Accomplishments/Planned Programs Subtotals | | | | | | - | - | 22.880 | - | 22.880 | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • EC2: Adv Armor-Piercing (ADVAP) for Small Cal Ammo | - | 3.755 | 6.821 | - | 6.821 | - | - | - | - | 0.000 | 10.576 |

UNCLASSIFIED

| | | | | | | | | | | | |
|--|---------|---------|-----------------|--|------------------|---------|---------|--|------------------|---------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | | | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • EP5: Adv Armor-Piercing (ADVAP) for Small Caliber Ammo | 13.318 | 16.748 | 0.000 | - | 0.000 | - | - | - | - | 0.000 | 30.066 |
| Remarks | | | | | | | | | | | |
| Budget Activity 4 PE 0603639A, Project EC2-RDTE/Adv Armor-Piercing (ADVAP) for Small Cal Ammo: This funding line starts the rapid development/rapid prototyping work on the Special Purpose (SP) ammunition for the Next Generation Squad Weapon (NGSW) systems. | | | | | | | | | | | |
| Budget Activity 5 PE 0604802A, Project EP5-RDTE/Adv Armor-Piercing (ADVAP) for Small Caliber Ammo: This funding line starts the rapid prototyping/development work on the General Purpose (GP) ammunition for the Next Generation Squad Weapon (NGSW) systems. | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| The Next Generation Squad Weapon (NGSW) ammunition program will utilize rapid prototyping acquisition strategy under Section 804 Authority to develop ammunition concepts/designs for the General Purpose (GP) variant and the Special Purpose (SP) variant. The project will utilize Government developed projectile designs that will be delivered to development contractors as Government Furnished Material (GFM). The Government will select up to three contractors for the weapon system development and down-select to a single contractor in FY 2021, prior to production contract award; with a planned Urgent Materiel Release (UMR) in FY 2022 and Full Materiel Release (FMR) in FY 2024. Follow-on development efforts for additional NGSW ammunition variants including tracer ammunition, blank ammunition, reduced range ammunition, and Close Combat Mission Capability Kit (CCMCK) ammunition will start in FY 2022. | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|---|-----------------------------------|---|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|---|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Follow-on Ammo Prototypes/Concepts | MIPR | Armament Research Development and Engineering Center (ARDEC) : New Jersey | - | - | | - | | 0.200 | Oct 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| Projectile Development Contract | TBD | To Be Determined : To Be Determined | - | - | | - | | 9.080 | Jan 2020 | - | | 9.080 | Continuing | Continuing | Continuing |
| Subtotal | | | - | - | | - | | 9.280 | | - | | 9.280 | Continuing | Continuing | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Development and Prototyping | MIPR | Armament Research Development and Engineering Center (ARDEC) : New Jersey | - | - | | - | | 6.460 | Oct 2019 | - | | 6.460 | Continuing | Continuing | Continuing |
| Projectile Development and Support | MIPR | Army Research Lab : Aberdeen, Maryland | - | - | | - | | 3.140 | Oct 2019 | - | | 3.140 | Continuing | Continuing | Continuing |
| Subtotal | | | - | - | | - | | 9.600 | | - | | 9.600 | Continuing | Continuing | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Prototype Testing ARDEC | MIPR | Armament Research Development and Engineering Center (ARDEC) : New Jersey | - | - | | - | | 0.900 | Oct 2019 | - | | 0.900 | Continuing | Continuing | Continuing |
| Army Research Lab (ARL) | MIPR | Aberdeen Proving Ground : Maryland | - | - | | - | | 2.200 | Oct 2019 | - | | 2.200 | Continuing | Continuing | Continuing |

UNCLASSIFIED

| | | | | | | | | | | | | | | |
|---|--|--|--|--|--|---|--|--|--|---|--|-------------------------|--|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | | | | |

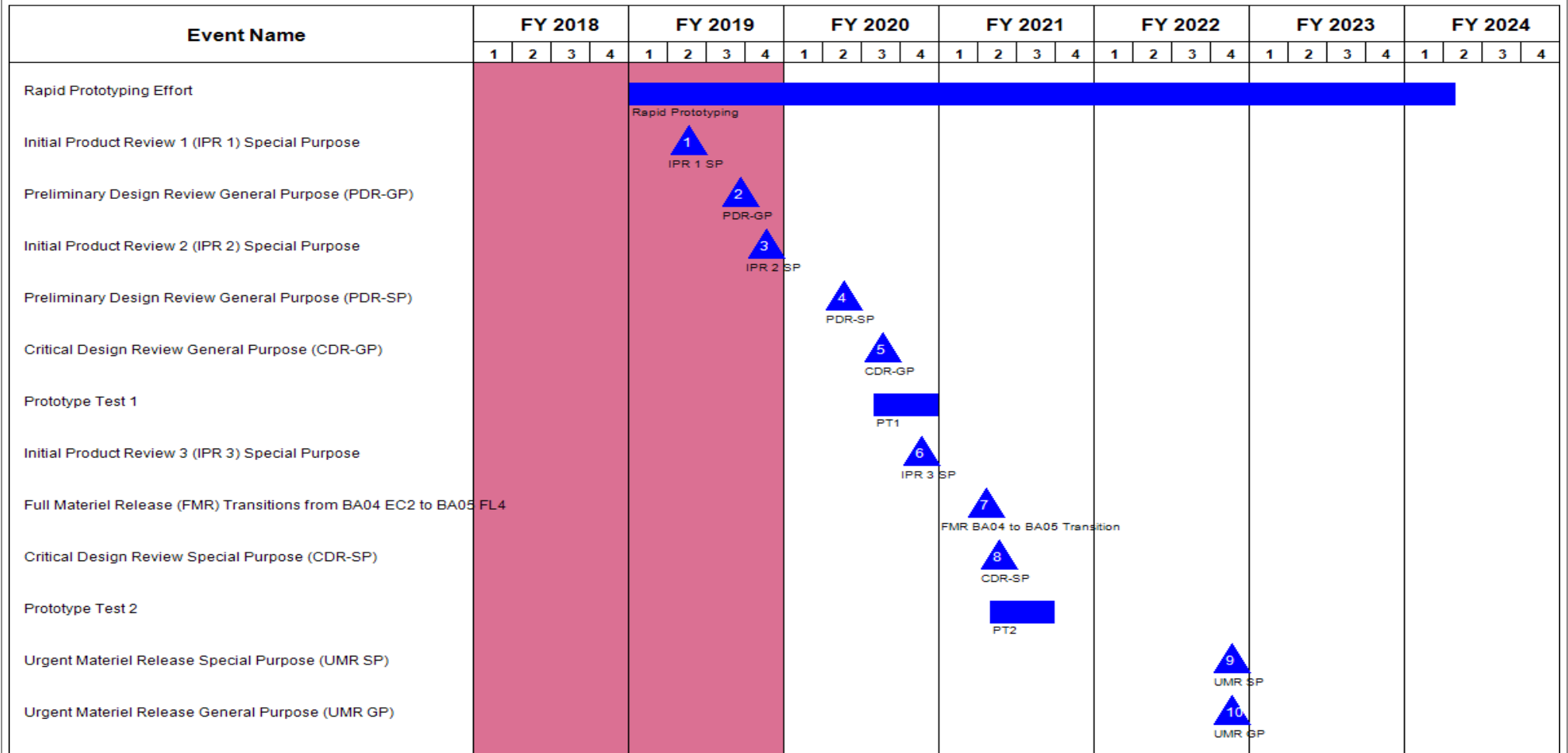
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
|--------------------------------------|------------------------|------------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| 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 Ground : Maryland | - | - | | - | | 0.900 | Oct 2019 | - | | 0.900 | Continuing | Continuing | Continuing |
| Subtotal | | | - | - | | - | | 4.000 | | - | | 4.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| Project Cost Totals | - | - | 0.000 | 22.880 | - | 22.880 | Continuing | Continuing | N/A |

Remarks

UNCLASSIFIED

| | | | | | |
|--|--|---|-------------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| Appropriation/Budget Activity 2040 / 5 | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | |



UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|---|---|---|---------|---|------------------|---|--|---|---|---|---------|---|---|---|---------|---|---|---|---|---|---|---|---------|---|---|---|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | | | | | | | | | | | | | | Date: March 2019 | | | | | | | | | | | | | | | | | | | | | |
| Appropriation/Budget Activity 2040 / 5 | | | | | | | | | | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | | | | | | | | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | | | | | | | | | | | | | | | | | | | |
| Event Name | | | | | | | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
| | | | | | | | | | | 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 |
| Rapid Fielding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | <div>Rapid Fielding</div> <div>PQT SP</div> <div><div>11</div>FMR</div> | | | | | | | |
| Production Qualification Test Special Purpose (PQT SP) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full Materiel Release (FMR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|---|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| Appropriation/Budget Activity 2040 / 5 | R-1 Program Element (Number/Name) PE 0604802A / Weapons and Munitions - Eng Dev | Project (Number/Name) FL4 / Small Caliber Ammo for Next Gen Squad Weapons | |

Schedule Details

| Events | Start | | End | |
|---|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| Rapid Prototyping Effort | 1 | 2019 | 2 | 2024 |
| Initial Product Review 1 (IPR 1) Special Purpose | 2 | 2019 | 2 | 2019 |
| Preliminary Design Review General Purpose (PDR-GP) | 3 | 2019 | 3 | 2019 |
| Initial Product Review 2 (IPR 2) Special Purpose | 4 | 2019 | 4 | 2019 |
| Preliminary Design Review General Purpose (PDR-SP) | 2 | 2020 | 2 | 2020 |
| Critical Design Review General Purpose (CDR-GP) | 3 | 2020 | 3 | 2020 |
| Prototype Test 1 | 3 | 2020 | 4 | 2020 |
| Initial Product Review 3 (IPR 3) Special Purpose | 4 | 2020 | 4 | 2020 |
| Full Materiel Release (FMR) Transitions from BA04 EC2 to BA05 FL4 | 2 | 2021 | 2 | 2021 |
| Critical Design Review Special Purpose (CDR-SP) | 2 | 2021 | 2 | 2021 |
| Prototype Test 2 | 2 | 2021 | 3 | 2021 |
| Urgent Materiel Release Special Purpose (UMR SP) | 4 | 2022 | 4 | 2022 |
| Urgent Materiel Release General Purpose (UMR GP) | 4 | 2022 | 4 | 2022 |
| Rapid Fielding | 4 | 2022 | 1 | 2026 |
| Production Qualification Test Special Purpose (PQT SP) | 1 | 2023 | 2 | 2023 |
| Full Materiel Release (FMR) | 2 | 2024 | 2 | 2024 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | | Date: March 2019 | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| S36: Precision Guidance Kit | - | 14.218 | 28.188 | 30.500 | - | 30.500 | 3.691 | 3.174 | 3.753 | 3.531 | 0.000 | 87.055 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| A. Mission Description and Budget Item Justification | | | | | | | | | | | | |
| The Precision Guidance Kit (PGK) is a course correcting fuze that provides precision accuracy and efficiency for current and future 155mm High Explosive (HE) projectiles by eliminating a portion of the inherent errors associated with ballistic firing solutions which effectively reduces the number of projectiles required to execute fire missions. PGK utilizes a Global Positioning System (GPS) receiver and internal Guidance and Navigation Computer to accomplish its mission with point detonating and height of burst fuzing functions. The PGK M1156E1 effort will incorporate and qualify state of the art technologies to increase the functionality of PGK in GPS degraded environments as well as compatibility with the Army's new long range cannon (Extended Range Cannon Artillery (ERCA)) and projectiles which will be fielded during the PGK Life Cycle. PGK Anti-Jam (PGK-AJ) supports the National Defense Strategy, the Army Long Range Precision Fires (LRPF) Cross Functional Team (CFT), future 155mm projectiles and M777 Long Range Cannon (LRC) initiatives. FY 2020 funding supports the award of the Engineering and Manufacturing Development (EMD) contract initiating system design and prototype development for PGK-AJ. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Contractor Engineering and Manufacturing Development (EMD) | | | | | | | | 10.656 | 23.871 | 26.685 | - | 26.685 |
| Description: Contractor Engineering and Manufacturing Development (EMD) | | | | | | | | | | | | |
| FY 2019 Plans: Will continue to support Technology Maturation Risk Reduction activities via Department of Defense Ordnance Technology Consortium (DOTC) contracts with system and receiver developers leading to a Preliminary Design Review (PDR). This includes various support system test activities. | | | | | | | | | | | | |
| FY 2020 Base Plans: Will support Engineering and Manufacturing Development (EMD) activities including prototype development, build and test activities as well as tactical guided flight testing in the threat environment. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 funding increase due to continued transition into Engineering and Manufacturing Development (EMD). | | | | | | | | | | | | |
| Title: Government and Engineering Support | | | | | | | | 3.006 | 2.534 | 2.815 | - | 2.815 |
| Description: Engineering Support | | | | | | | | | | | | |
| FY 2019 Plans: | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | |
|--|--|--|------------------|---|--------------|-------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | Date: March 2019 | | | | |
| 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 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Support of Technology Maturation and Risk Reduction (TMRR) development and test activities. Provide engineering and analysis for the system and GPS receiver TMRR development and test activities. FY 2020 Base Plans: Engineering support of development, build and test activities which will include prototype and tactical guided flight testing. FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 funding increase supports engineering and testing initiatives. | | | | | | | |
| Title: Continue Development/Operational Testing Description: Development/Operational Test. FY 2019 Plans: Execute Precision Guided Kit (PGK) Anti-Jam (AJ) concept and subsystem maturation. Perform Preliminary Design Review. FY 2020 Base Plans: Engineering support of development, build and test activities which will include prototype and tactical guided flight testing. FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 funding increase required as an entry point to Prototype development and testing. | | | 0.556 | 0.750 | 1.000 | - | 1.000 |
| Title: FY 2019 SBIR / STTR Transfer FY 2019 Plans: FY 2019 SBIR / STTR Transfer FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer | | | - | 1.033 | - | - | - |
| Accomplishments/Planned Programs Subtotals | | | 14.218 | 28.188 | 30.500 | - | 30.500 |
| | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | |
|---|---------|---------|-----------------|---|------------------|---------|---------|---|------------------|---------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Army | | | | | | | | | Date: March 2019 | | |
| 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 | | | |
| C. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| • E99250: FUZE, 155mm ARTY Precision Guidance Kit (PGK) | 144.410 | 217.933 | 0.000 | 164.176 | 164.176 | 186.350 | 79.114 | 72.595 | 76.105 | Continuing | Continuing |
| Remarks | | | | | | | | | | | |
| Procurement of Ammunition, Army (PAA) Funding | | | | | | | | | | | |
| D. Acquisition Strategy | | | | | | | | | | | |
| The Precision Guidance Kit (PGK) is a Global Positioning System (GPS) guidance kit with fuzing functions for 155mm High Explosive (HE) artillery projectiles. PGK provides near precision accuracy and effectiveness for 155mm HE projectiles. 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 Anti-Jam (PGK-AJ) 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 DoD Ordnance Technology Consortium (DOTC) Other Transaction Agreement (OTA) concept development efforts with multiple contractors in FY 2017, followed by a DOTC Risk Reduction concept maturation phase in FY 2019. This will be followed by a competitive Federal Acquisition Regulation (FAR) based contractual Engineering & Manufacturing Development (EMD) effort beginning in FY 2020. | | | | | | | | | | | |
| E. Performance Metrics | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 | | | |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | 13.664 | 0.283 | Oct 2017 | 0.060 | Oct 2018 | 0.060 | Oct 2019 | - | | 0.060 | 0.000 | 14.067 | 14.067 |
| Subtotal | | | 13.664 | 0.283 | | 0.060 | | 0.060 | | - | | 0.060 | 0.000 | 14.067 | N/A |
| Remarks Program Management support includes PGK-AJ travel and documentation support. | | | | | | | | | | | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 Anti-Jam EMD Development Contract | C/CPAF | TBD : TBD | - | - | | 6.361 | Nov 2019 | 26.685 | Mar 2020 | - | | 26.685 | 0.000 | 33.046 | 33.046 |
| DOTC - PGK GPS Anti-Jam Development - GD-OTS | MIPR | DoD Ordnance Technology (DOTC) - General Dynamics Ordnance & Tactical Systems : Bothell, WA | 2.017 | 5.399 | Feb 2018 | 5.150 | Jan 2019 | - | | - | | - | 0.000 | 12.566 | 7.167 |
| DOTC - PGK GPS Anti-Jam Development - BAE | MIPR | DoD Ordnance Technology (DOTC) - BAE Systems / Rokar : Minneapolis, MN | 2.017 | 5.257 | Feb 2018 | 5.150 | Jan 2019 | - | | - | | - | 0.000 | 12.424 | 7.167 |
| DOTC - PGK GPS Anti-Jam Development - L3 IEC | MIPR | DOD Ordnance Consortium (DOTC) - L3 - IEC : Various | 3.341 | - | | 7.210 | Apr 2019 | - | | - | | - | 0.000 | 10.551 | 10.551 |
| PGK TD Contract | C/CPAF | Alliant Techsystems (ATK) : Plymouth, MN | 5.279 | - | | - | | - | | - | | - | 0.000 | 5.279 | 5.279 |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|--|------------------------|--|-------------|---------|------------|--|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 | 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 | 59.953 |
| PGK EMD - Phase 3a to 5 | C/FFP | Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN | 32.443 | - | | - | | - | | - | | - | 0.000 | 32.443 | 32.443 |
| 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 | 4.774 | - | | - | | - | | - | | - | 0.000 | 4.774 | 4.774 |
| Engineering & Technology Assessment. Low Cost Course Correction solutions. | C/CPFF | BAE Systems/ Rokar : Minneapolis, MN | 1.778 | - | | - | | - | | - | | - | 0.000 | 1.778 | 1.778 |
| DOTC - PGK GPS Anti-Jam Development - Raytheon | MIPR | DoD Ordnance Technology Consortium (DOTC) - Raytheon : Ft Wayne, IN | 3.296 | - | | - | | - | | - | | - | 0.000 | 3.296 | 3.296 |
| DOTC - PGK GPS Anti-Jam Development - O-ATK | MIPR | DoD Ordnance Technology Consortium (DOTC) - Orbital-Alliant Techsystems (O-ATK) : Plymouth, MN | 8.217 | - | | - | | - | | - | | - | 0.000 | 8.217 | 8.217 |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|--|------------------------|---|-------------|---------|------------|--|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| DOTC - PGK GPS Anti-Jam Development - Rockwell Collins | MIPR | DoD Ordnance Technology Consortium (DOTC) - Rockwell Collins : Cedar Rapids, IA | 1.561 | - | | - | | - | | - | | - | 0.000 | 1.561 | 1.561 |
| FY 2019 SBIR / STTR Transfer | TBD | TBD : TBD | - | - | | 1.033 | | - | | - | | - | 0.000 | 1.033 | - |
| Subtotal | | | 128.000 | 10.656 | | 24.904 | | 26.685 | | - | | 26.685 | 0.000 | 190.245 | N/A |
| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Government Engineering Support | MIPR | Armament Research, Development and Engineering Center (ARDEC) : Picatinny Arsenal, NJ | 33.460 | 2.723 | Oct 2017 | 2.474 | Oct 2018 | 2.755 | Oct 2019 | - | | 2.755 | 0.000 | 41.412 | 41.412 |
| Management Support | MIPR | Camber : Mt Arlington, NJ | 2.041 | - | | - | | - | | - | | - | 0.000 | 2.041 | 2.041 |
| Miscellaneous Support Contract | MIPR | MITRE Corporation : Fort Monmouth, NJ | 0.600 | - | | - | | - | | - | | - | 0.000 | 0.600 | 0.600 |
| Jammer Support | MIPR | Electronic Proving Ground (EPG) : Ft Huachuca, AZ | 0.316 | - | | - | | - | | - | | - | 0.000 | 0.316 | 0.316 |
| PGK Parallel Studies and Analysis Support | MIPR | Command and Control Directorate : Ft Monmouth, NJ | 0.300 | - | | - | | - | | - | | - | 0.000 | 0.300 | 0.300 |
| LNO Support - Ft. Sill | MIPR | US ARMY Field Artillery Center : Ft. Sill, OK | 0.201 | - | | - | | - | | - | | - | 0.000 | 0.201 | 0.201 |
| ATEC Support | MIPR | Army Test and Evaluation | 0.041 | - | | - | | - | | - | | - | 0.000 | 0.041 | 0.041 |

UNCLASSIFIED

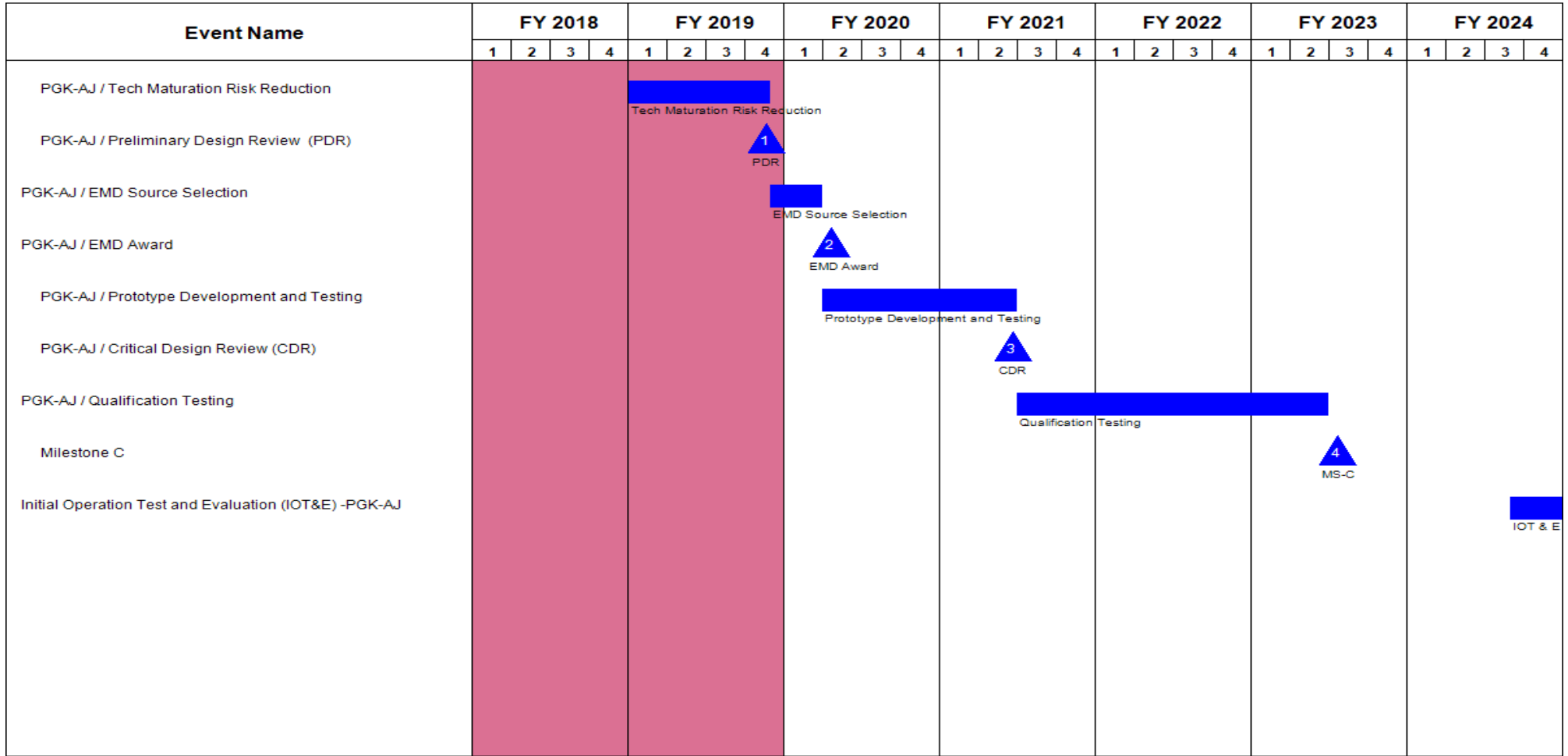
| | | | | | | | | | | | | | | | |
|---|-----------------------------------|--|--------------------|----------------|-------------------|---|-------------------|---------------------|-------------------|--------------------|-------------------|--|-------------------------|-------------------|---------------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| | | Command (ATEC) : Aberdeen, MD | | | | | | | | | | | | | |
| Subtotal | | | 36.959 | 2.723 | | 2.474 | | 2.755 | | - | | 2.755 | 0.000 | 44.911 | N/A |
| Test and Evaluation (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| Development Testing for GPS Anti-Jam | MIPR | Army Test and Evaluation Command (ATEC) Yuma Proving Ground (YPG) : Yuma, AZ | 0.590 | 0.556 | Dec 2018 | 0.750 | Feb 2019 | 1.000 | Aug 2020 | - | | 1.000 | 0.000 | 2.896 | 2.896 |
| 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 Ground (YPG) : Yuma, AZ | 1.000 | - | | - | | - | | - | | - | 0.000 | 1.000 | 1.000 |

UNCLASSIFIED

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army | | | | | | | | | | | | Date: March 2019 | | | |
|--|------------------------------|---|----------------|---|---------------|---------|---------------|---|---------------|----------------|---------------|------------------|---------------------|---------------|--------------------------------|
| 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 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 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 |
| 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 |
| Subtotal | | | 17.000 | 0.556 | | 0.750 | | 1.000 | | - | | 1.000 | 0.000 | 19.306 | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | 195.623 | 14.218 | | 28.188 | | 30.500 | | - | | 30.500 | 0.000 | 268.529 | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|---|--|--|------------------|---|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army | | | Date: March 2019 | | |
| 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 | |



UNCLASSIFIED

| | | | |
|---|--|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army | | | Date: March 2019 |
| 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 |
| PGK-AJ / Tech Maturation Risk Reduction | 1 | 2019 | 4 | 2019 |
| PGK-AJ / Preliminary Design Review (PDR) | 4 | 2019 | 4 | 2019 |
| PGK-AJ / EMD Source Selection | 4 | 2019 | 1 | 2020 |
| PGK-AJ / EMD Award | 2 | 2020 | 2 | 2020 |
| PGK-AJ / Prototype Development and Testing | 2 | 2020 | 2 | 2021 |
| PGK-AJ / Critical Design Review (CDR) | 2 | 2021 | 2 | 2021 |
| PGK-AJ / Qualification Testing | 3 | 2021 | 2 | 2023 |
| Milestone C | 3 | 2023 | 3 | 2023 |
| Initial Operation Test and Evaluation (IOT&E) -PGK-AJ | 3 | 2024 | 4 | 2024 |